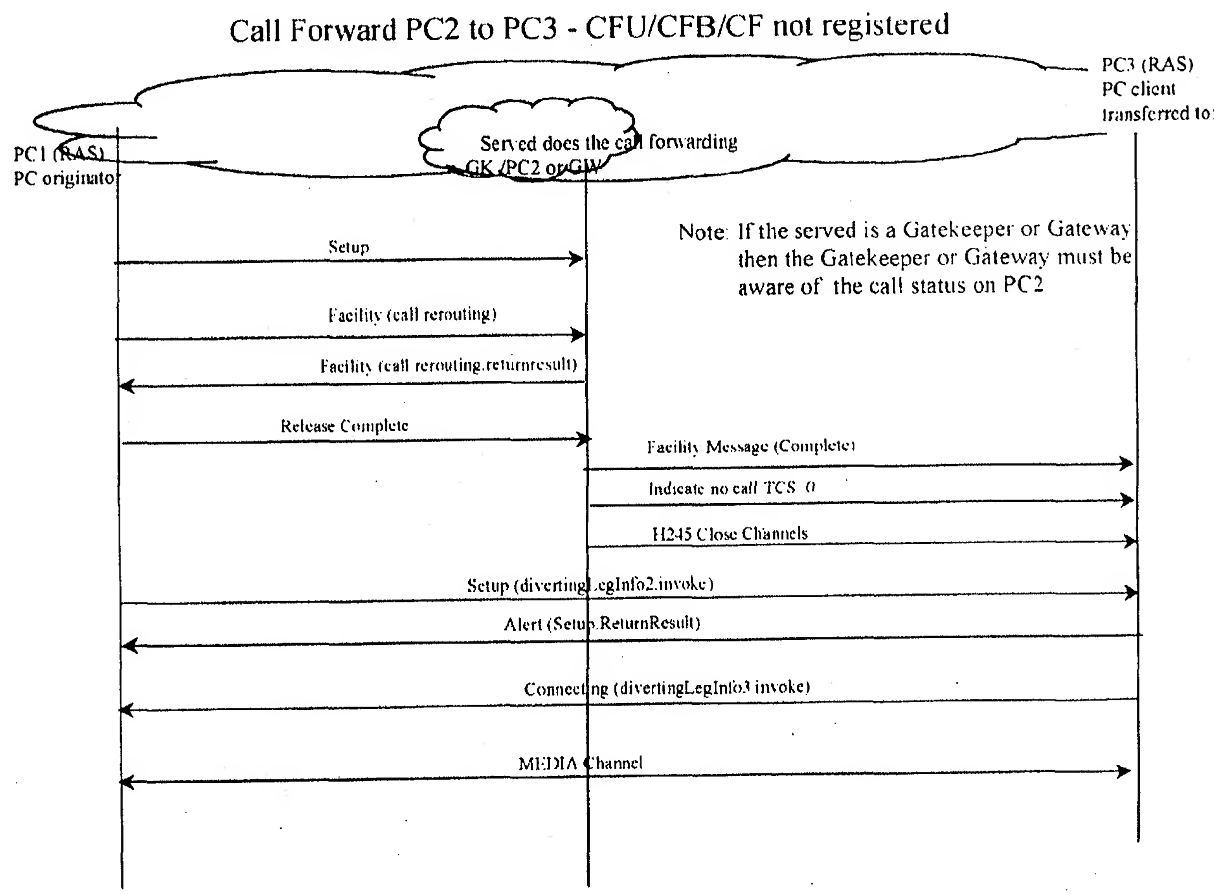
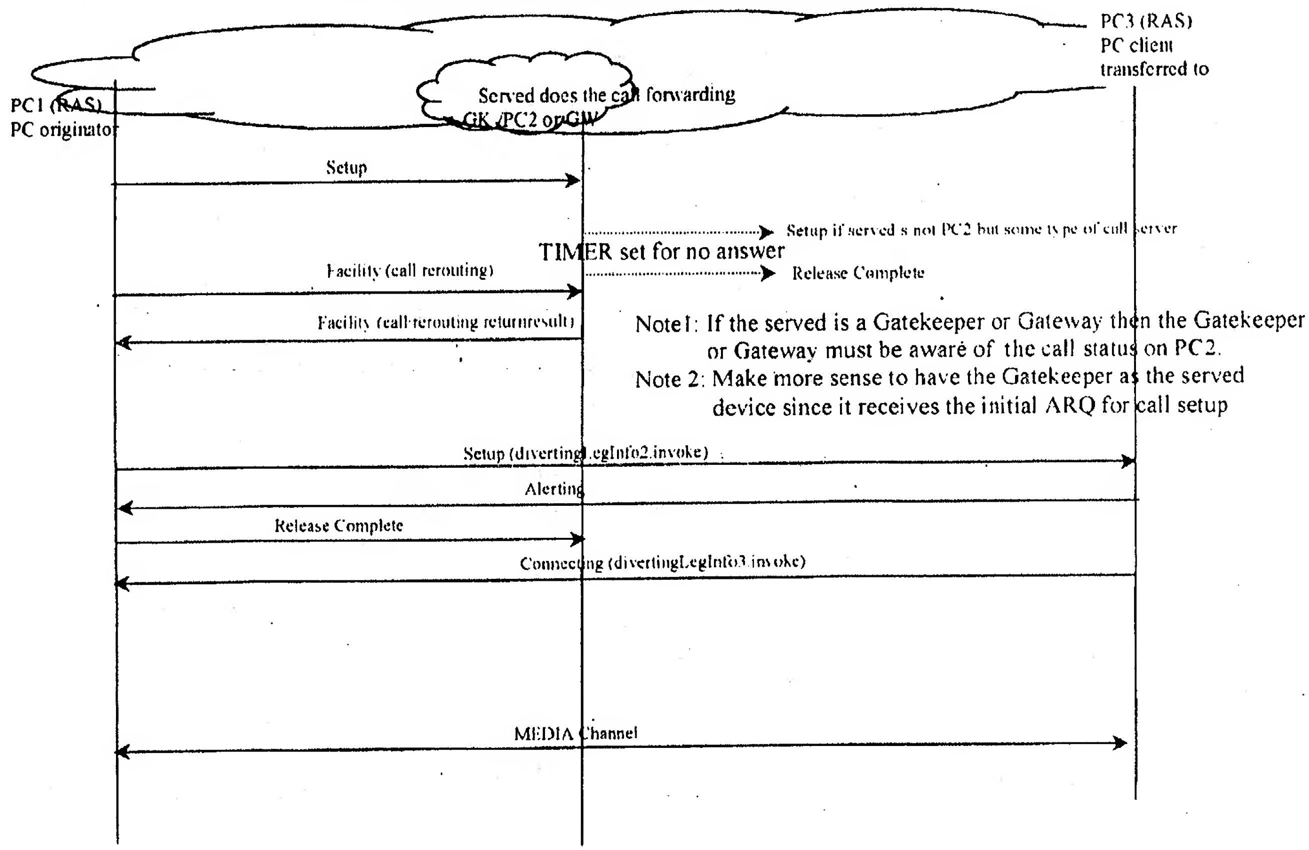
CFU/CFB/CF not registered



CF No Answer

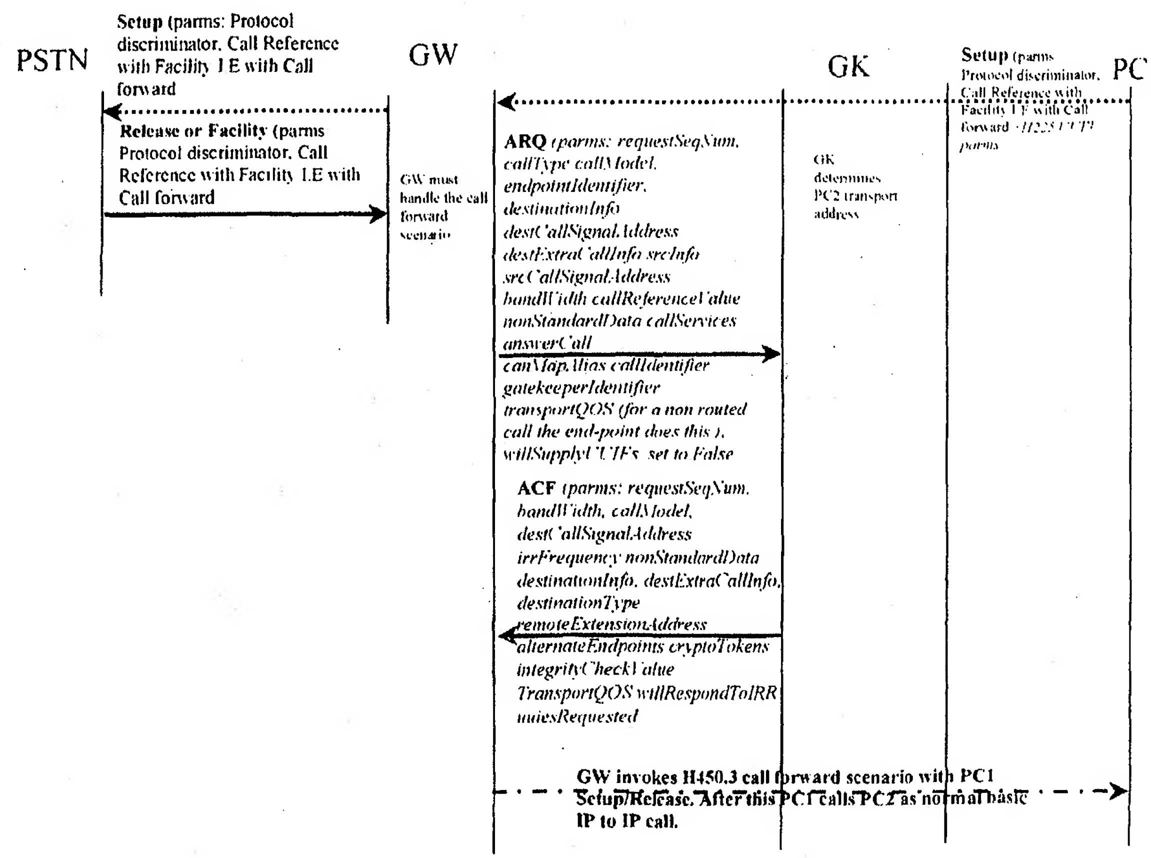
Call Forward PC2 to PC3 - CF No Answer



Call Forward Problems

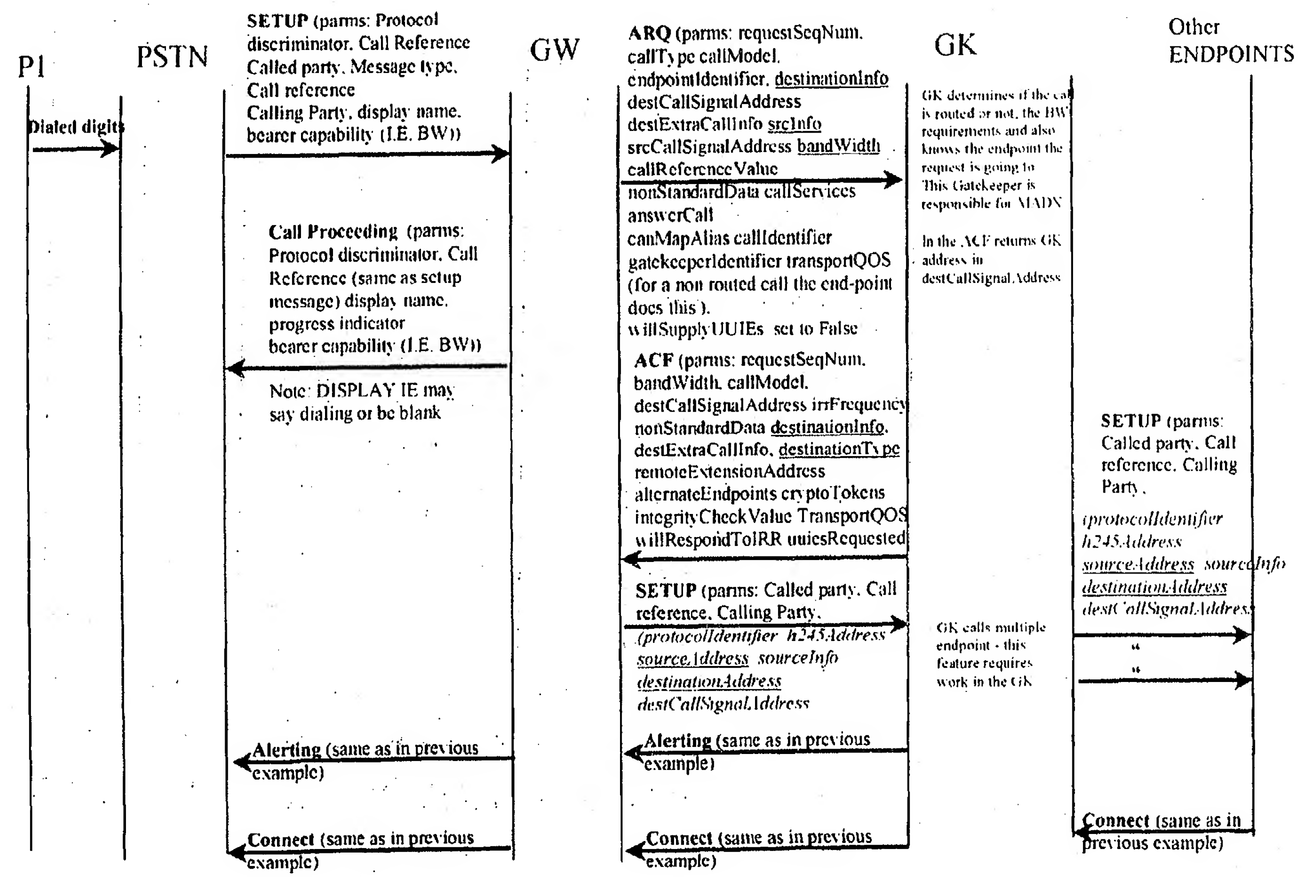
If the originating terminal calls the PC1 (PC1 itself is responsible for call forwarding - SERVED). PC1 is registered but is not responding to setup messaging and hence will not forward the call. It is better to have the SERVED as the GK and possibly the Gateway. Since ARQ call queries are sent to the GK, it is logical to have the call forwarding functionality there also.

PC1 calls P1 which is forwarded to PC2



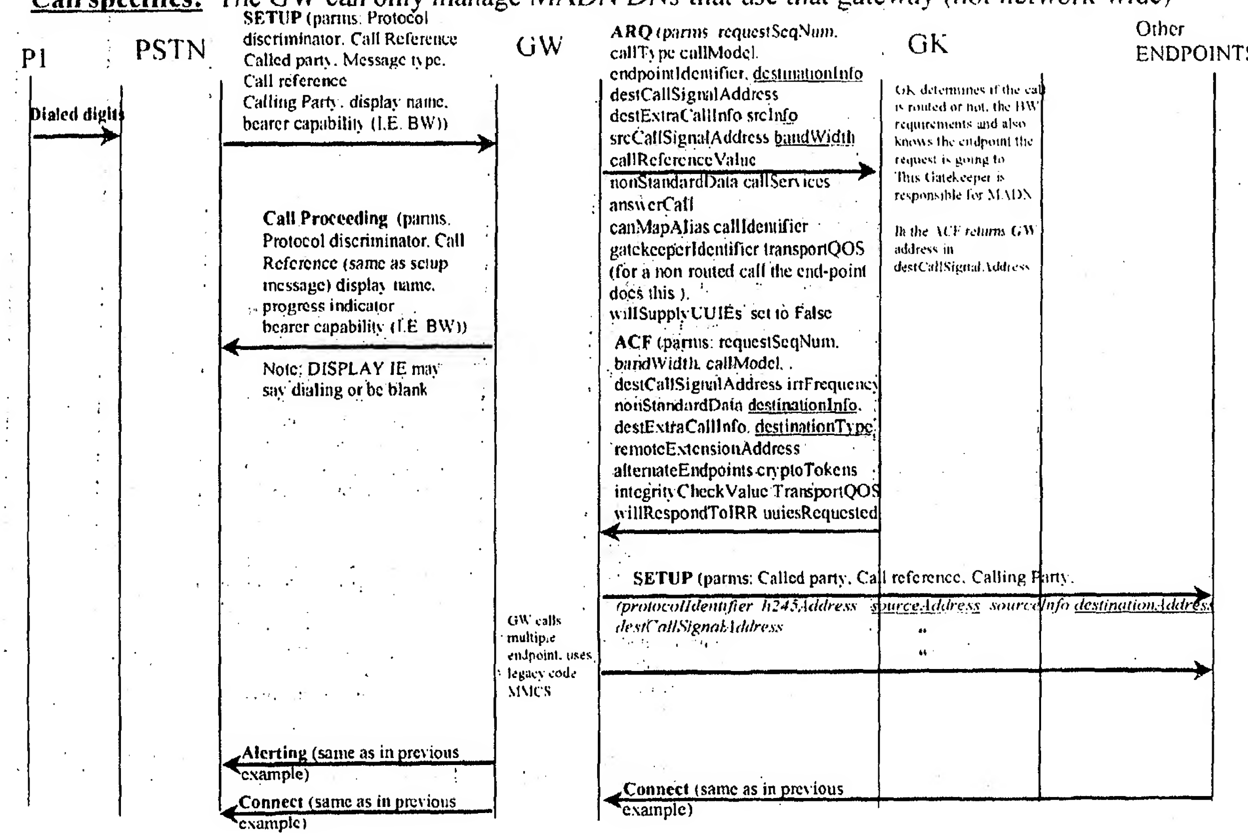
MLA & MADN

MADN: P1 calls a MADN - GK is responsible for MADN



MADN: P1 calls a MADN - GW is responsible for MADN

Call specifics: The GW can only manage MADN DNs that use that gateway (not network-wide)



MLA: P1 calls a MLA PC1 - GK or GW handles

For MLA the Call Scenario is identical to the MADN scenarios for the GK and GW since these devices will handle the call setup. The media channel will be establish after the call has been established and will be direct. The MMCS GW contains legacy code to do but will require modification, however for both the MADN and the MLA services managed by the Gateway, the features are restricted to those terminals served by this Gateway. The gatekeeper would need work for this feature to added

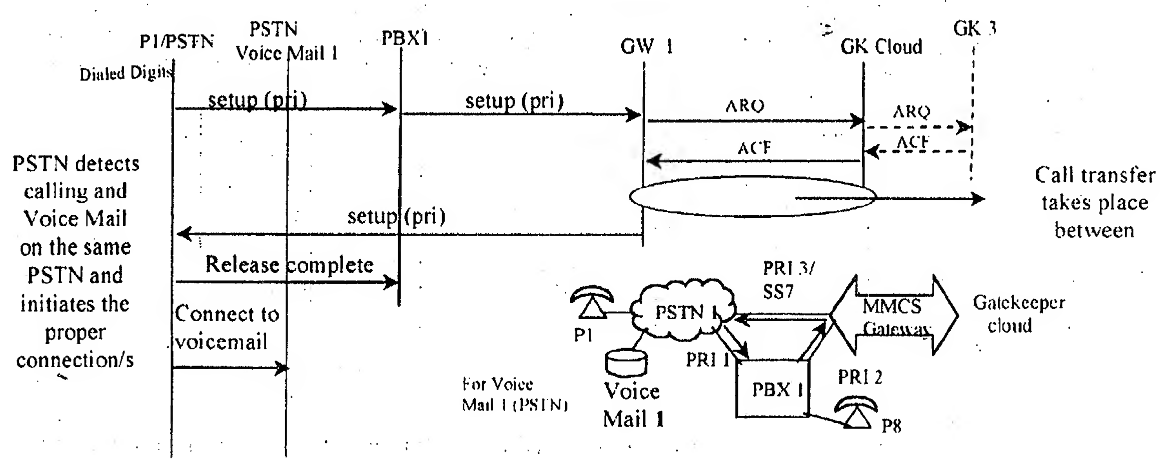
Both MADN and MLA do not require **APDU supplementary services** to be developed as these are features more capably handled by a **Call Server** device, I.E. GW or GK.

Voice Mail Call Flows

P1 to P8 (voice mail on PSTN)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to PC1 which is not registered. Voice Mail 1 on PSTN . Gatekeeper provisioned for WITH voice mail on the gatekeeper for P8. Gatekeeper uses H450.3 to reroute call to Voice Mail1. This only applies for routed call scenarios.



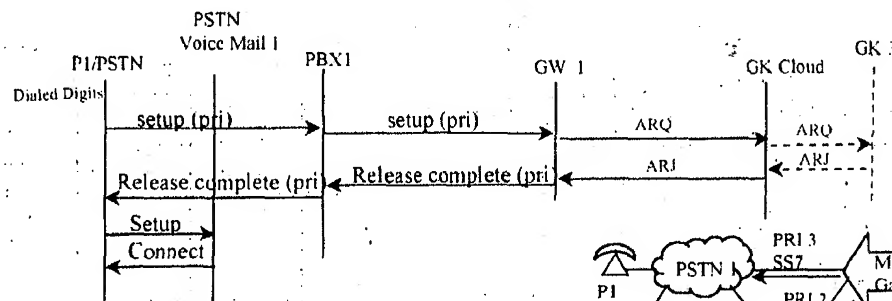
0 DS0's used as PSTN detects P1 and Voice mail on the same PSTN.

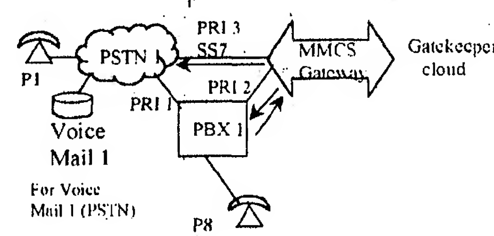
- Depending on the setup of the voice mail the callee may be required to enter the number of the phone of the called party, this is NOT desired functionality.

P1 to P8 (voice mail on PSTN)

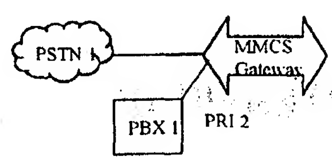
Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is not registered**. Voice Mail 1 on PSTN . Gatekeeper rejects call. The PSTN knows that call cannot be terminated because of a release complete message, then the PSTN voice mail is to be used for P8.





0 DS0's used as PSTN detects P1 and Voice mail on the same PSTN. This would work the same way with a call busy scenario (except for the extra setup messages to terminating phone)

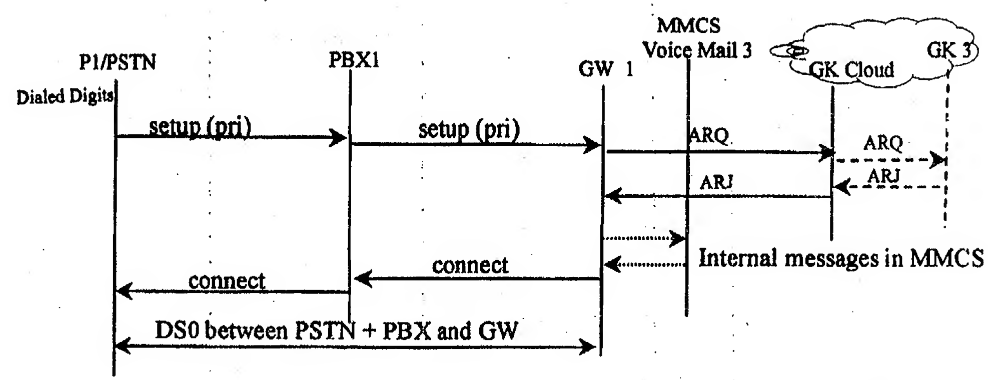


Another option is to have the PBX is connected to MMCS directly. This would cause extra Q9:31 setup messages since all PBX messages will go through the MMCS. **NOT GOOD !!**

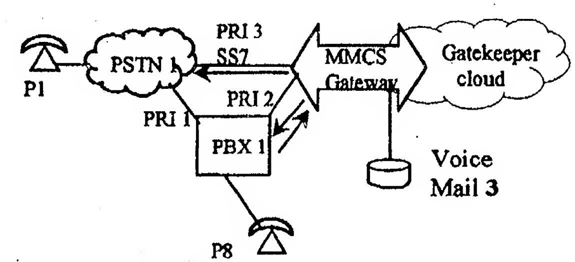
P1 to P8 (voice mail on MMCS/GW)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to PC1 which is **not registered**. Voice Mail 3 on MMCS/GW.



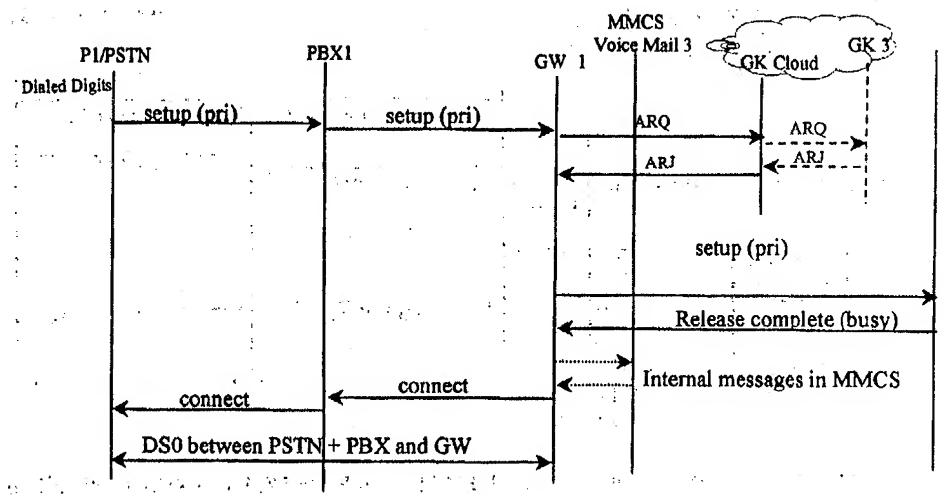
2 DS0's between PSTN and MMCS.



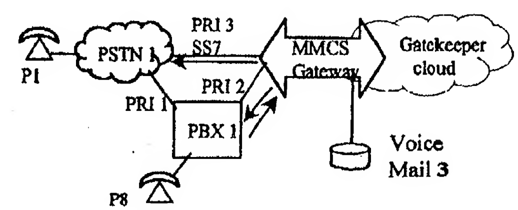
P1 to P8 (voice mail on MMCS/GW)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to a **BUSY PC1**. Voice Mail 3 on MMCS/GW .



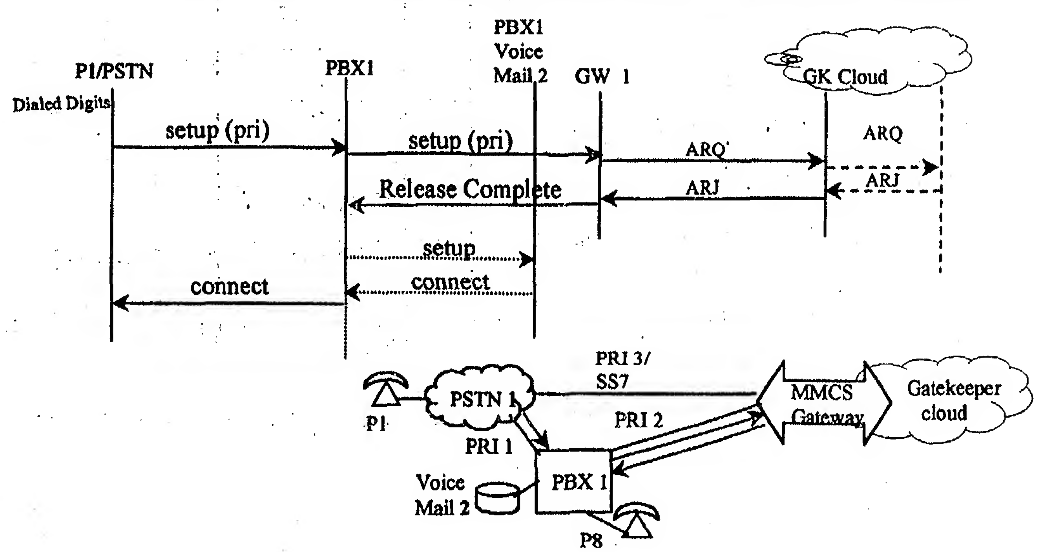
2 DS0's between PSTN and MMCS.



P1 to P8 (voice mail on PBX1 - express mail)

Call specifics.

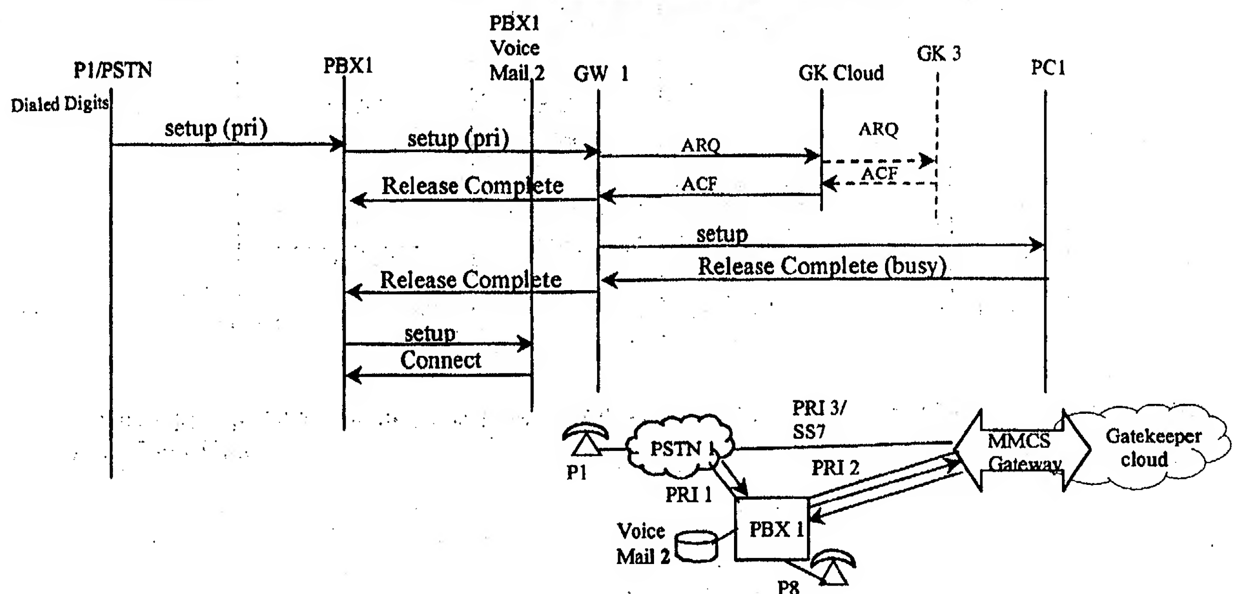
Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is not registered**. Voice Mail 2 on PBX1.



1 DS0 is taken by the call between P1 and Voice Mail 2.
Can the PBX handle a release complete and forward to a internal mail? I Don't believe so!

P1 to P8 (voice mail on PBX1 - express mail)

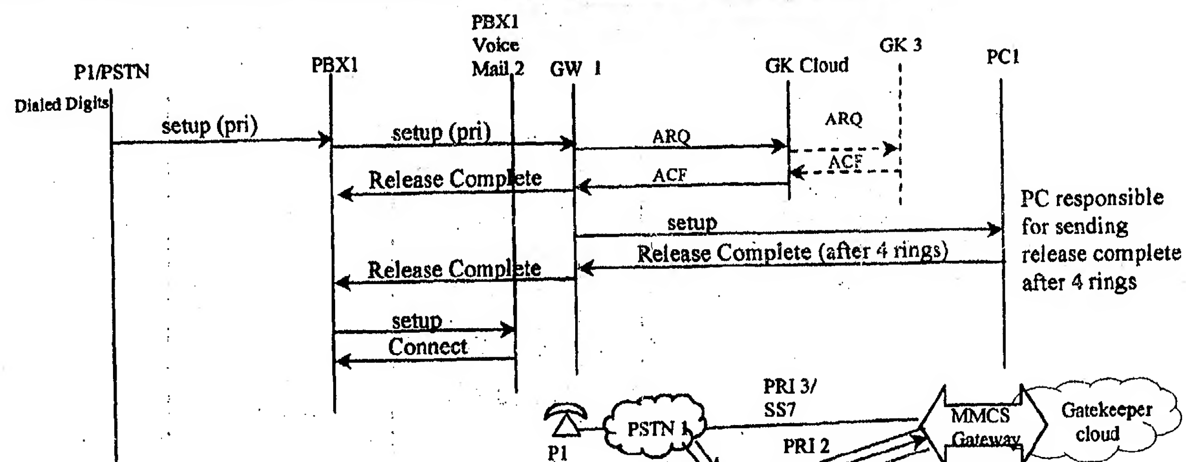
Call specifics.
Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is BUSY**. Voice Mail 2 on PBX1.

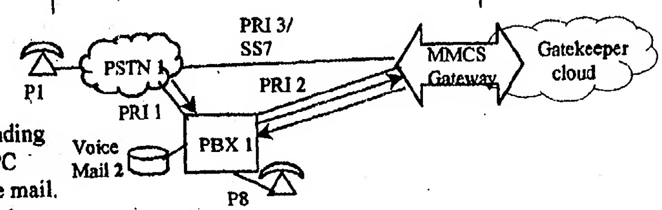


P1 to P8 (voice mail on PBX1 - express mail)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 but does not answer the phone**. Voice Mail 2 on PBX1.





There is a possible problem if the PC1 is responsible for sending the release complete, but does not do so (need work at the PC client so that after 4 rings). Call would never go to the voice mail. There are 2 other options which illustrated on the following 2 pages:

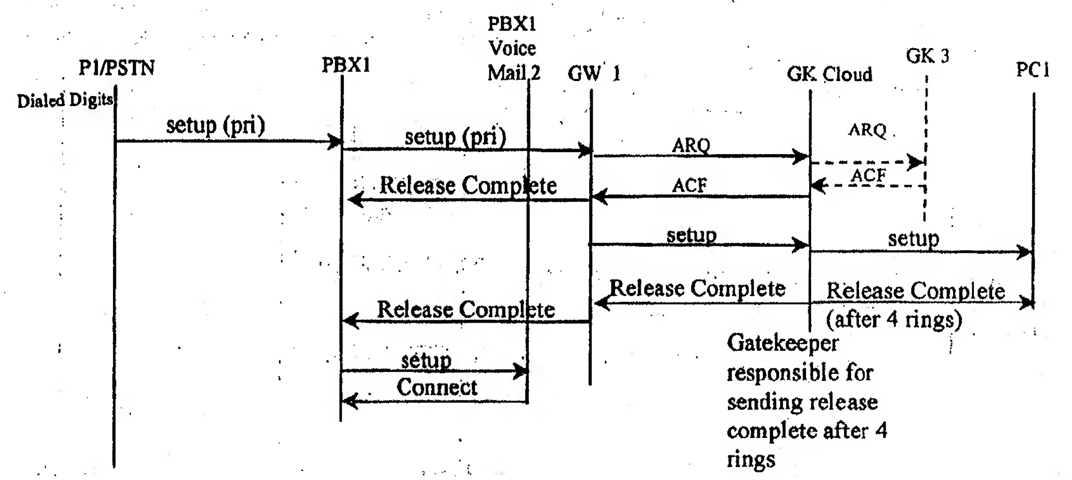
- It may be better to use a routed call model in this case via gatekeeper - Option 1
- After 4 rings the PBXsends a release complete to the gateway and connects to the PBX voice mail. Can the PBX do this presently? - Option 2

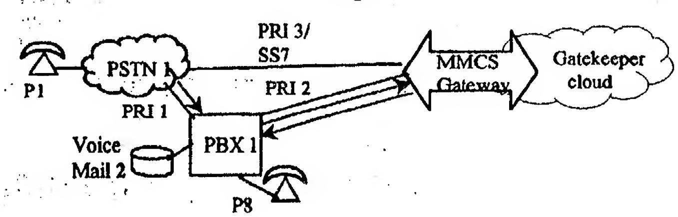
P1 to P8 (voice mail on PBX1 - express mail)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is not answering**. Voice Mail 2 on PBX1.

OPTION1: Gatekeeper handles call control (this only works for routed calls)



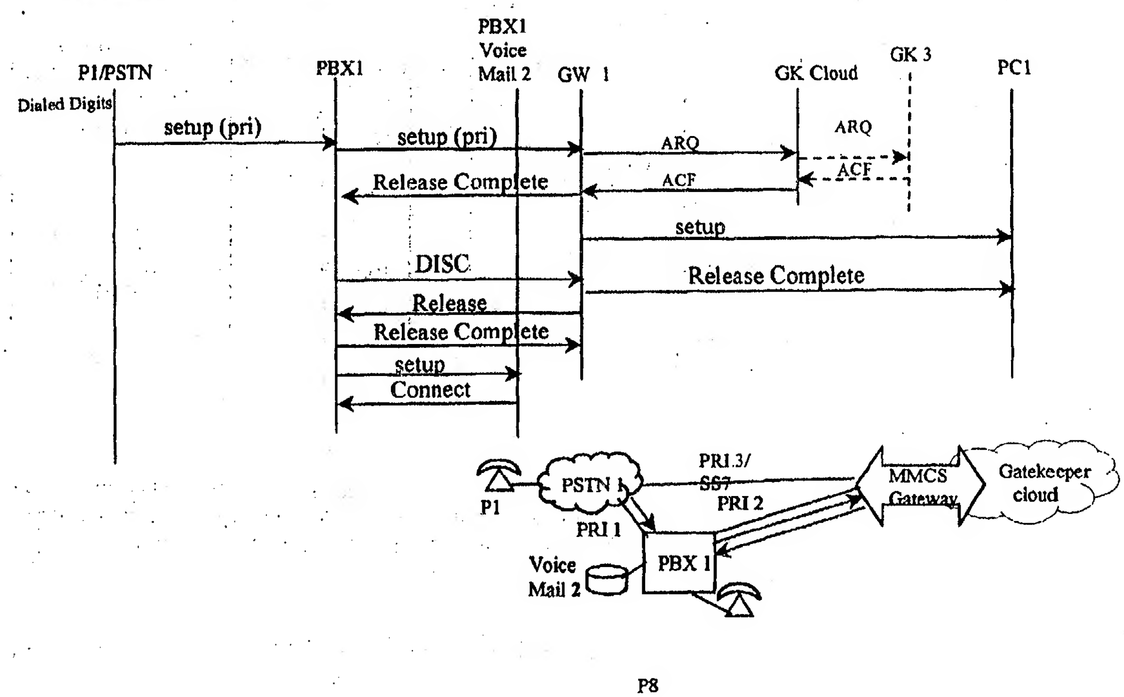


P1 to P8 (voice mail on PBX1 - express mail)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is not answering**. Voice Mail 2 on PBX1.

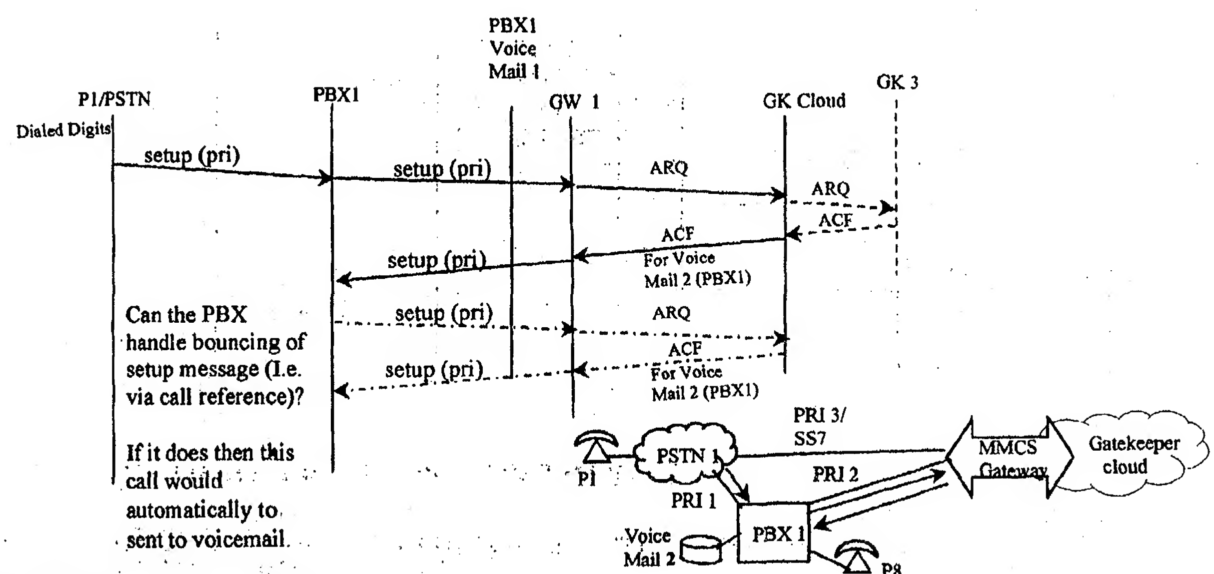
OPTION2: PBX call times out a sends DISCONNECT



Scenario B: P1 to P8 (voice mail on PBX1 - return call to DN on P8)

Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is not registered**. If the PC1 cannot be reached so the gatekeeper is provisioned to to send calls sent to the DN on P8. Essentially this equivalent to P8 and PC1 forwarded to each other and the setup messages could potentially bounce until CP resources are exhausted unless detected (Need to put this in a testcase)



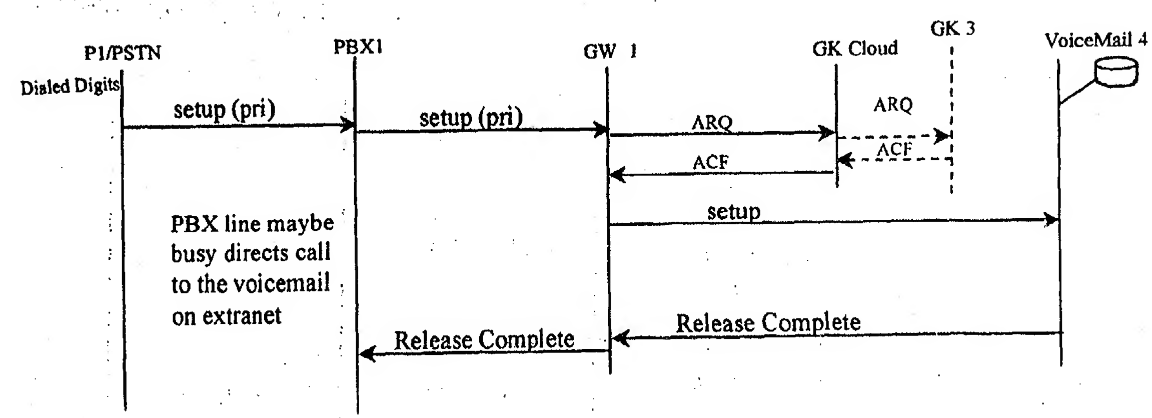
This call takes up 3 trunks (I.E. 3 DS0's).

- Depending on the setup of the voice mail the callee may be required to enter the number of the phone of the called party, again as in the last scenario this is not desired functionality as they maybe required to enter the 5digit corporate DN instead of the E.164 dialled (ambiguous DN).

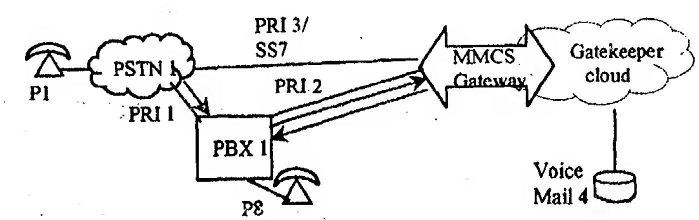
P1 to P8 (voice mail on Extranet)

Call specifics.

Call from P1 to P8 (phone on PBX1). Voice Mail 4 on extranet.



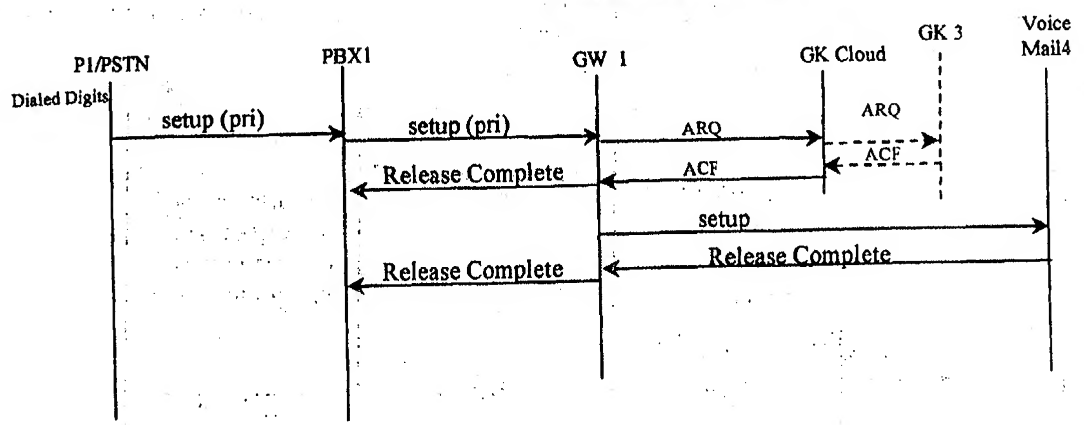
Gatekeeper routes call to VoiceMail 4



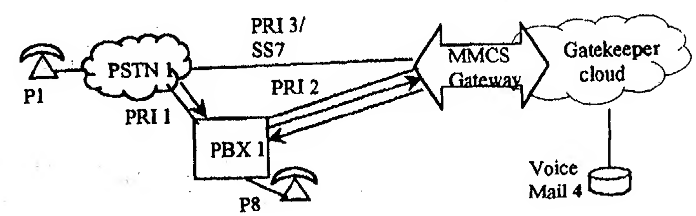
P1 to P8 (voice mail on Extranet)

<u>Call specifics.</u>

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **<u>PC1 which is not registered</u>**. <u>Voice Mail 4</u> on extranet



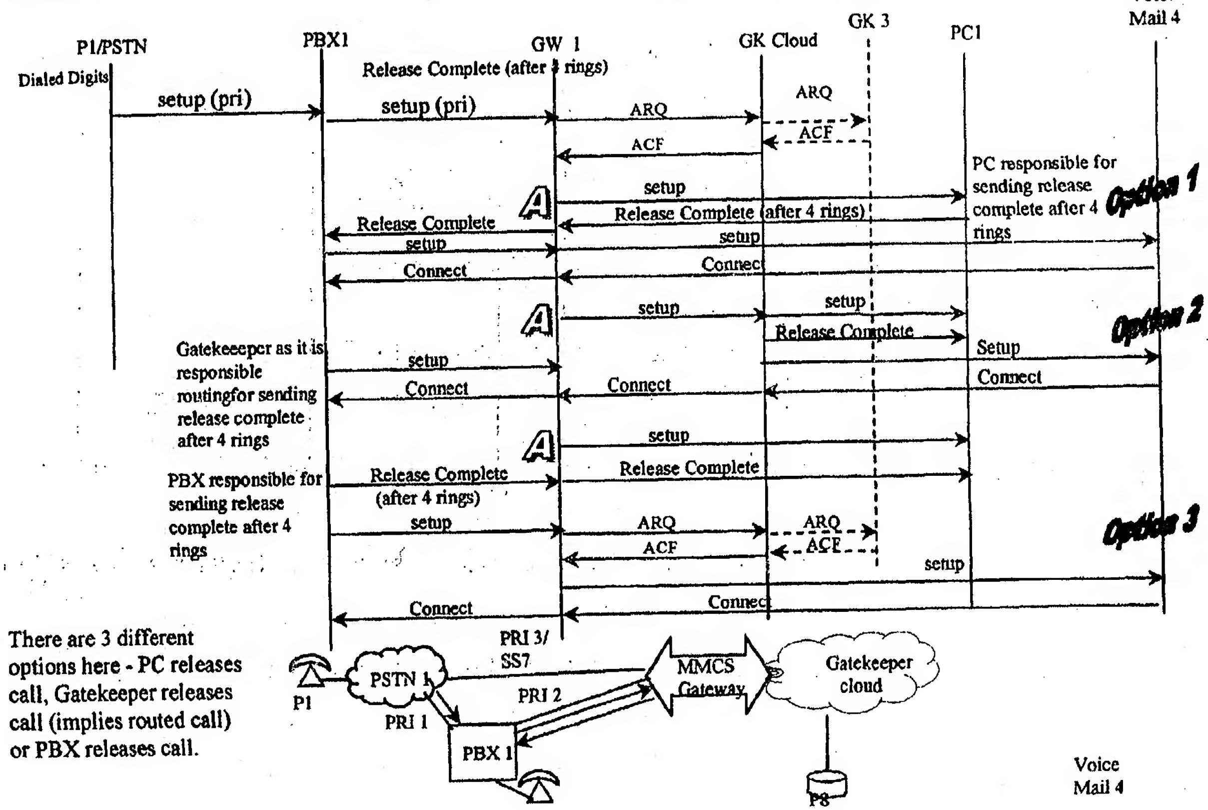
Gatekeeper routes call to VoiceMail 4



P1 to P8 (voice mail on Extranet)

Call specifics.

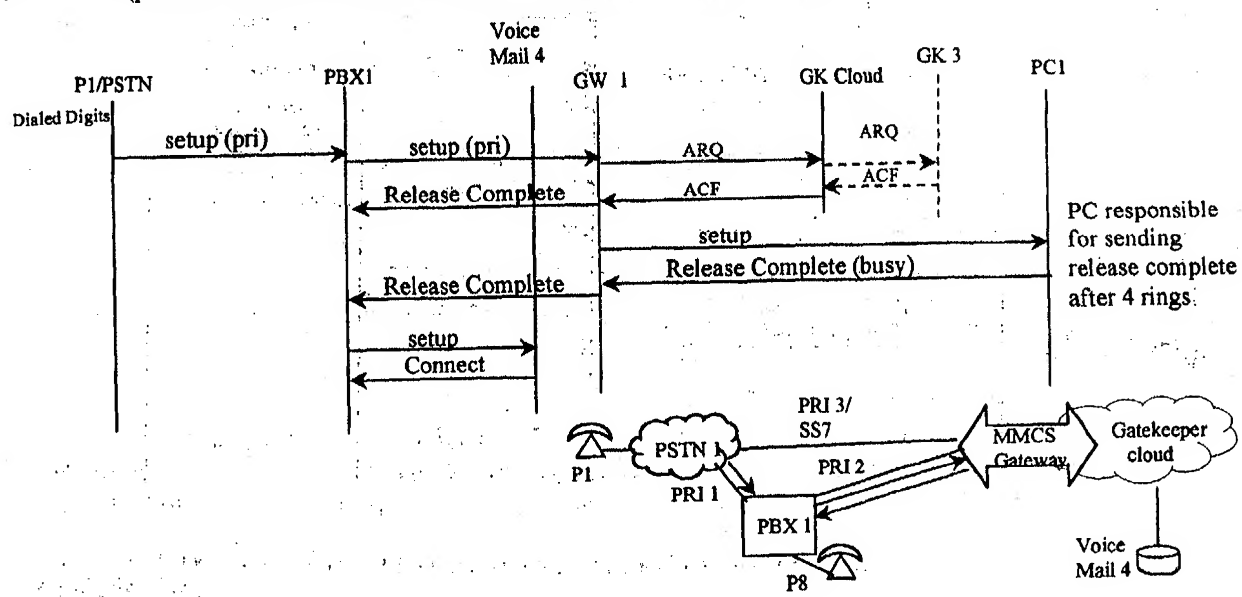
Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 but does not answer the phone**. Voice Mail 4 on Extranet.



There are 3 different options here - PC releases call, Gatekeeper releases call (implies routed call) or PBX releases call.

P1 to P8 (voice mail on Extranet)

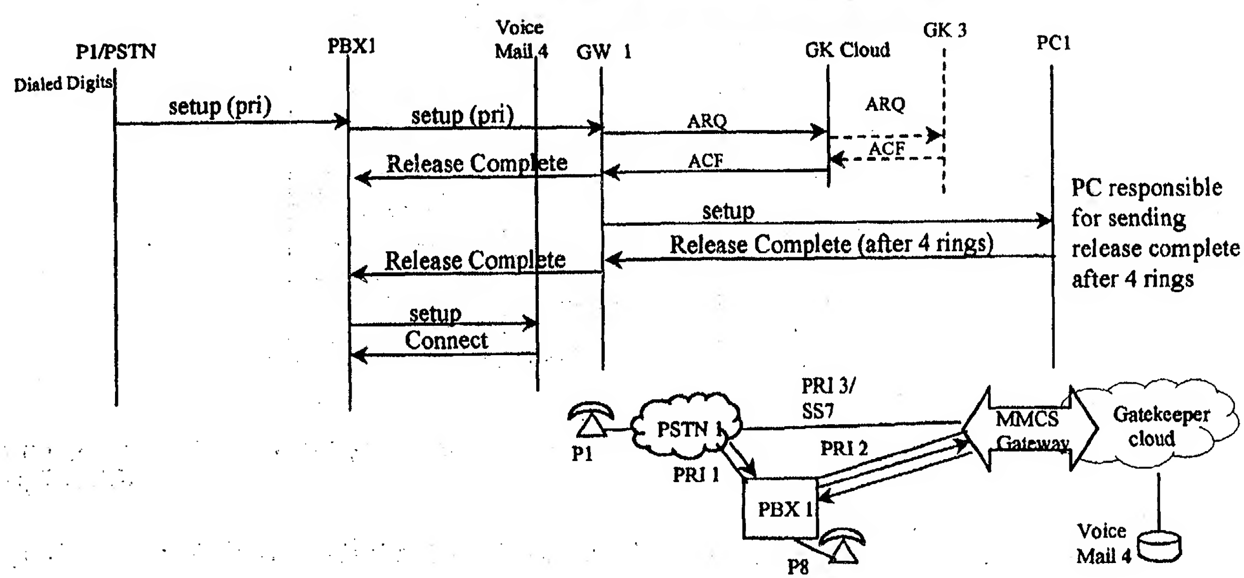
Call specifics.
Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 which is busy**. Voice Mail 4 on Extranet.



P1 to P8 (voice mail on Extranet)

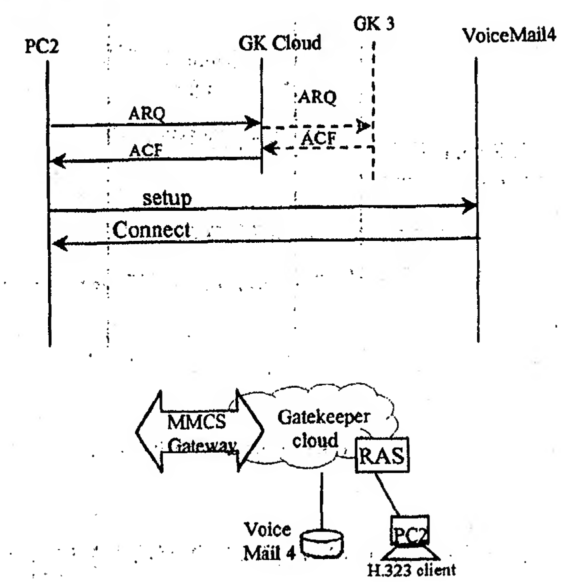
Call specifics.

Call from P1 to P8 (phone on PBX1). P8 is call forwarded to **PC1 but does not answer the phone**. Voice Mail 4 on Extranet.



Calling PC1 via gateway or within extranet (voice mail on Extranet)

<u>Call specifics.</u>
Call to PC1but **PC1 is not registered**. Voice Mail 4 on Extranet.



Calling PC1 via gateway or within extranet (voice mail on Extranet)

Call specifics.

Call to PC1but **PC1 is connected to voiceMail,** Voice Mail 4 on Extranet.

For these scenarios there are 2 options:

1) The gatekeeper could route the call and handles all call processing for call setup and release (I.e. checking if PC1 is not answering or busy then routing call to voice mail4. This requires work in Gatekeeper

2) Or use the call forwarding scenarios (**CFU/CFB/CF not registered page in slides**). The Served (node responsible for call forwarding, normally a gatekeeper) forward calls to voice mail. This also requires work in gatekeeper or PC client depending which node is the **served.**

IP TELEPHONY GATEWAY APPENDIX 4

Mapping between Q931 parameters and the H225/ARQ parameters

Mapping Q931 parms to H225/ARQ parms

H225/ARQ message	Q.931 on PSTN
requestSeqNum	
callType *use point-to-point default*	
callModel. *Direct or gatekeeper routed*	
endpointIdentifier *GW,GK or terminal.*	
destinationInfo *E.164 called number*	called party
destCallSignalAddress *transport address used at the destination for call signaling.*	
destExtraCallInfo	
srcInfo *E.164 calling number*	calling party
srcCallSignalAddress *- transport address used at the source for call signaling.*	
bandWidth *- the number of 100 bps requested for the bi-directional call.*	bearercapability
callReferenceValue *- the CRV from Q.931 for this call; only local validity. This is used by a gatekeeper to associate the ARQ with a particular call.*	callreference may be not the same as on the Gateway
nonStandardData *- carries information not defined in this recommendation (for example, proprietary data)*	
callServices *- provides information on support of optional Q-series protocols to gatekeeper and called terminal.*	3WC call ?
conferenceID *- unique conference identifier.*	Conference Call using Multicasting
activeMC *- if TRUE, the calling party has an active MC; otherwise FALSE.*	"
answerCall *- used to indicate to a gatekeeper that a call is incoming.*	
canMapAlias *TRUE indicates ACF containing destinationInfo, destExtraCallInfo and or remoteExtension fields, can be copied this information to the same fields in SETUP message respectively.*	
callIdentifier *a globally unique call identifier set by the originating endpoint which can be used to associate RAS signaling with the modified Q.931 signaling used in H.225.0*	Not a Callreference
srcAlternatives *prioritized source endpoint alternatives for srcInfo,* ***srcCallSignalAddress,*** *or rasAddress*	alternative calling party not part of Q.931
destAlternatives *a sequence of prioritized destination endpoint alternatives for* ***destinationInfo*** *or destCallSignalAddress*	
gatekeeperIdentifier *gatekeeperIdentifier received in the alternateGatekeeper list in RCF*	
integrityCheckValue *encryption requirements*	
transportQOS *indicates QOS reservations done at endpoint, GK or none.*	
willSupplyUUIEs *set to False if the gatekeeoer does not require to see all UUIE call control messages.*	

Mapping Q931 parms to H225/ARQ parms

H225/ACF message — Q.931 on PSTN

requestSeqNum - *This shall be the same value that was passed in the ARQ.*

bandWidth - *the allowed maximum bandwidth for the call; may be less than that requested.* → **bearercapability**

callModel - *tells terminal whether call signaling sent on destCallSignalAddress goes to a gatekeeper (routed call) or to a terminal(direct call).*

destCallSignalAddress - *the transport address to which to send Q.931 call signaling, but may be an endpoint or gatekeeper address depending on the call model in use.*

irrFrequency - *the frequency, in seconds, that the endpoint shall send IRRs to the gatekeeper while on a call, including while on hold. If not present, the endpoint does not send IRRs while active on a call, and it is expected that the gatekeeper will poll the endpoint.*

nonStandardData - *carries information not defined in this recommendation (for example, proprietary data)*

destinationInfo *the address of the initial channel, used when calling through a gateway*

destExtraCallInfo - *needed to make possible additional channel calls, i.e. for a 2*64 Kbps call on the WAN side. Shall only contain E.164 addresses and shall not contain the number of the initial channel.*

destinationType - *This specifies the type of the destination endpoint i.e. gatekeeper, gateway, mcu, or terminal*

remoteExtensionAddress - *contains the alias address of a called endpoint in cases where this information is needed to traverse multiple Gateways*

alternateEndpoints - *a sequence of prioritized endpoint alternatives destCallSignalAddress or destinationInfo*

tokens - *This is some data which may be required to allow the operation. The data shall be inserted into the message if available.*

cryptoTokens - *encrypted tokens*

integrityCheckValue - *cryptographically based integrity check value*

TransportQOS - *Gatekeeper may indicates to the endpoint responsible for resource reservation.*

willRespondToIRR - *true if the Gatekeeper will send an IACK or INAK message in response to an unsolicited IRR message when the IRR's needsResponse field set to true.*

uuiesRequested *indicates the set of H.225.0 call signaling messages of which the endpoint shall notify the gatekeeper.*

SETUP UUIE message

protocolIdentifier *H.225 version*

h245Address *transport address on which the calling endpoint or gatekeeper handles establish of H.245 signaling. Sender is capable of handling H 245 procedures before receiving a CONNECT on the Call Signaling channel.*

sourceAddress *alias addresses for source I.E E.164 number Q.931 Calling Party Number IE.*

sourceInfo *Contains an EndpointType GW GK etc*

destinationAddress *E.164 address, same as Q.931 Called Party Number IE if available, include in the Setup message by version 2 terminals.*

destCallSignalAddress *- inform the gatekeeper of the destination terminal's call signaling transport address, redundant in the direct terminal-to-terminal case. If available must be filled in.*

destExtraCallInfo *additional channel calls, i.e. for a 2*64 Kbps on the WAN side. Contain E.164 addresses*

destExtraCRV *- CRVs for the additional SCN calls specified by destExtraCallInfo. Their use is for further study.*

activeMC *- Calling endpoint is under the influence of an active MC*

conferenceID *- unique conference identifier*

conferenceGoal

callIndependentSupplementaryService *- transport of supplementary services APDU's in a non-call related manner*

callServices *- provides information on support of optional Q-series protocols to gatekeeper and called terminal.*

callType *- default value is pointToPoint for all calls*

sourceCallSignalAddress *transport address for the source. Used in the ARQ message by the receiver of the Setup*

remoteExtensionAddress *alias address of a called endpoint. When needed to traverse multiple Gateways.*

callIdentifier *- a globally unique call identifier set by the originating endpoint which can be used to associate RAS signaling with the modified Q.931 signaling used in H.225.0*

h245SecurityCapability *- a set of capabilities the sender can use to secure the H.245 channel*

tokens *This is some data which may be required to allow the operation. The data shall be inserted into the message if available.*

cryptoTokens *- encrypted tokens*

fastStart *- Used only in the fast connect procedure, fastStart supports the signaling needed to open a logical channel. I.E OpenLogicalChannel structure defined in H.245. Sender indicates preferred mode Rx Tx, transport addresses where it expects to receive media streams.*

mediaWaitForConnect *If TRUE, indicates that the recipient of the Setup message shall not transmit media until sending the Connect message.*

canOverlapSend *- If TRUE, sender of Setup shall support overlap sending (set to false)*

SETUP UUIE message	H.225/Q.931 Setup header	Q.931 from PSTN
sourceAddress →	callingparty IE	callingparty IE
destinationAddress →	calledparty	calledparty

Note: In the **ARQ** message **srcInfo, destinationInfo** are equivalent to the **SETUP UUIE sourceAddress, destinationAddress** respectively.

Detailed Call Flow

Registration Accepted

Call specifics: PC1 registers with gatekeeper (registration accepted)

PC1 | RAS | GK

Road Warrior connects to RAS with his **unique identifier** (This will unlikely be an E.164 address as in GSM). Sends a Call reference for this call.

Assign an IP address to link with this call reference and knows the users home gatekeeper either from the unique id or from the E.164 address. RAS may assign him a temp address E.164 address (GSM). Assumption here is the RAS known which gatekeeper (note the endpoint gatekeeperIdentifier as part of parms.

RRQ *(parms: RequestSeqNum, endpointVendor, Terminalalias, rasaddress, Terminaltype, gatekeeperIdentifier, callSignaladdres)*

The terminal alias contains the E.164 address (or unique identifier for the PC). Check authorization to ensure E.164 number is valid

The E.164 and other alias address (I.e. unique identifier) are contained in the Terminal Alias field. Terminal type is GK, GW or terminal. The endpointVendor could be PC1 s.w I.e. netmeeting

Using the UniqueID, we could possibly validate if the user is authentic

RCF *(parms: RequestSeqNum, CallSignalAddress, terminalAlias, gatekeeperIdentifier* ***alternateGatekeeper, preGrantedARQ***

Other parameters indicate when to use ARQ or not

The Road Warrior receives authentication.

Note1: An E.164 address is location specific. How do we support a single DN across the PSTN and IP network. This can only be done using the GSM idiom

Note2: I have underlined parameters that are of interest to us for supplementary services.

Registration Rejected

Call specifics: PC1 registers with gatekeeper (registration rejected by gatekeeper)

PC1 | RAS | GK

PC1: Road Warrior connects to RAS with his **unique Identifier** (This will unlikely be an E.164 address as in GSM). Sends a Call reference for this call.

What is the user method to uniquely identify themselves?

RAS: Assign an IP address to link with this call reference and knows the users home gatekeeper either from the unique id or from the E.164 address. RAS may assign him a temp address E.164 address (GSM). Assumption here is the RAS known which gatekeeper (note the endpoint gatekeeperIdentifier as part of parms

RAS → GK: RRQ *(parms: RequestSeqNum, endpointVendor, Terminalalias, rasaddress, Terminaltype, gatekeeperIdentifier, callSignaladdres,* *willSupplyUUIEs set to false)*

GK: The terminal alias contains the E.164 address (or unique identifier for the PC1. Check authorization to ensure E.164 number is valid.

The E.164 and other alias address (I.e unique identifier) are contained in the TerminalAlias field. Terminal type is GK, GW or terminal. The endpointVendor could be PC1 s w I.e netmeeting and version

Authorization rejected the uniqueID not recognized?

Also when the user registers, can he program the the GK to forward their office phone to his road warrior automatically?

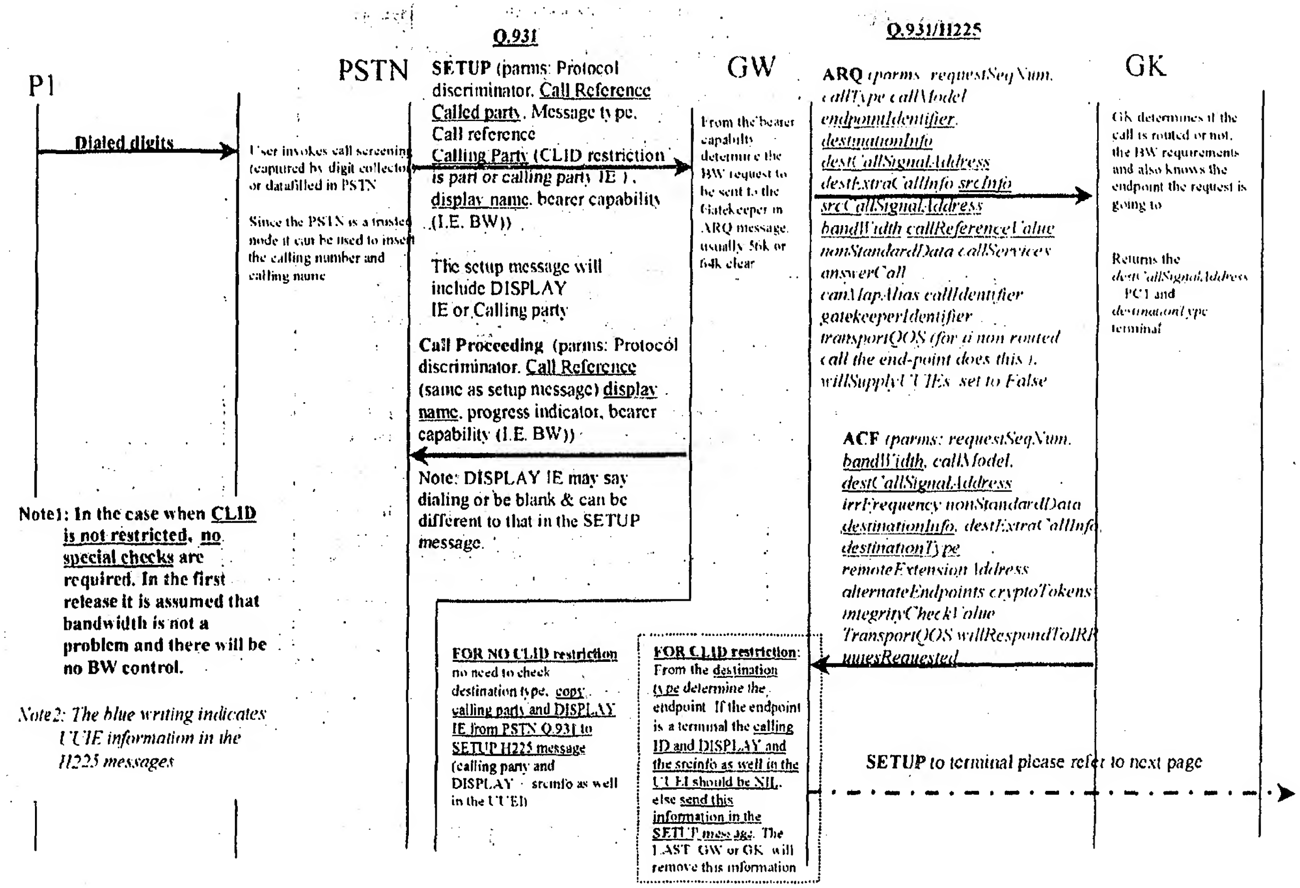
GK → RAS: RRJ *(parms: RequestSeqNum, rejectReason, gatekeeperIdentifier)*

RAS → PC1: The Road Warrior receives authorization

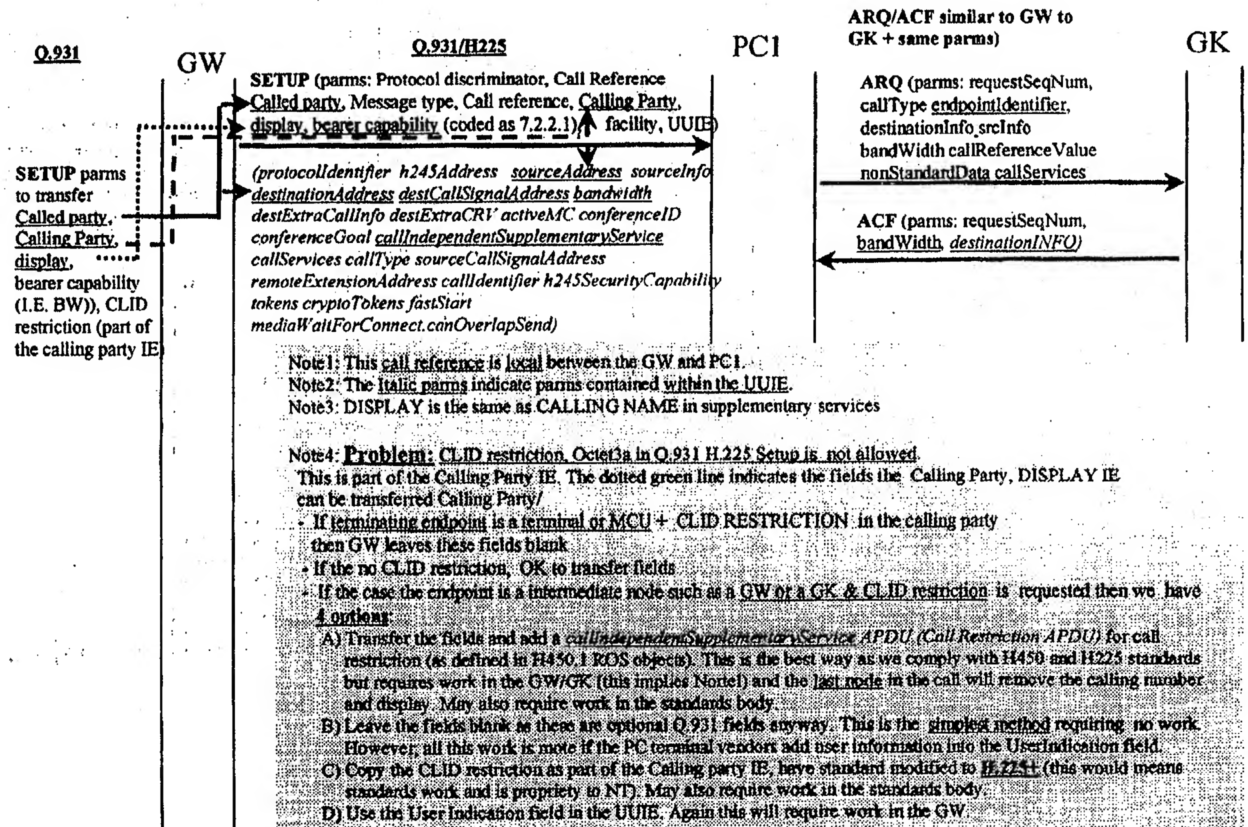
Note: An E.164 address is location specific.

How do we support a single DN across the PSTN and IP network. This can only be done using the GSM idiom of assigning a temporary E.164(done by RAS). User device has 3 ids. its own uniqueid, one assigned by RAS and an IP assigned by RAS. All must be sent to the GK.

P1 calls PC1 - Page 1



P1 calls PC1 - Page 2

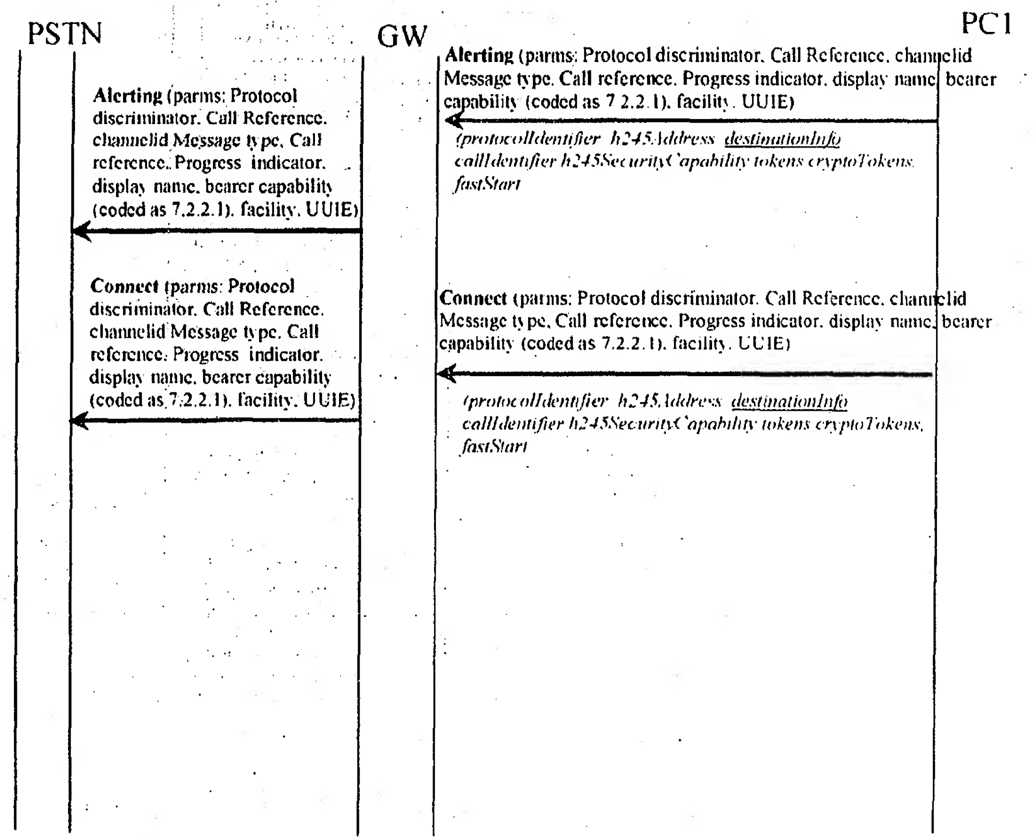


Note1: This call reference is local between the GW and PC1.
Note2: The Italic parms indicate parms contained within the UUIE.
Note3: DISPLAY is the same as CALLING NAME in supplementary services

Note4: **Problem:** CLID restriction, Octet3a in Q.931 H.225 Setup is not allowed.
This is part of the Calling Party IE. The dotted green line indicates the fields the Calling Party, DISPLAY IE can be transferred Calling Party/

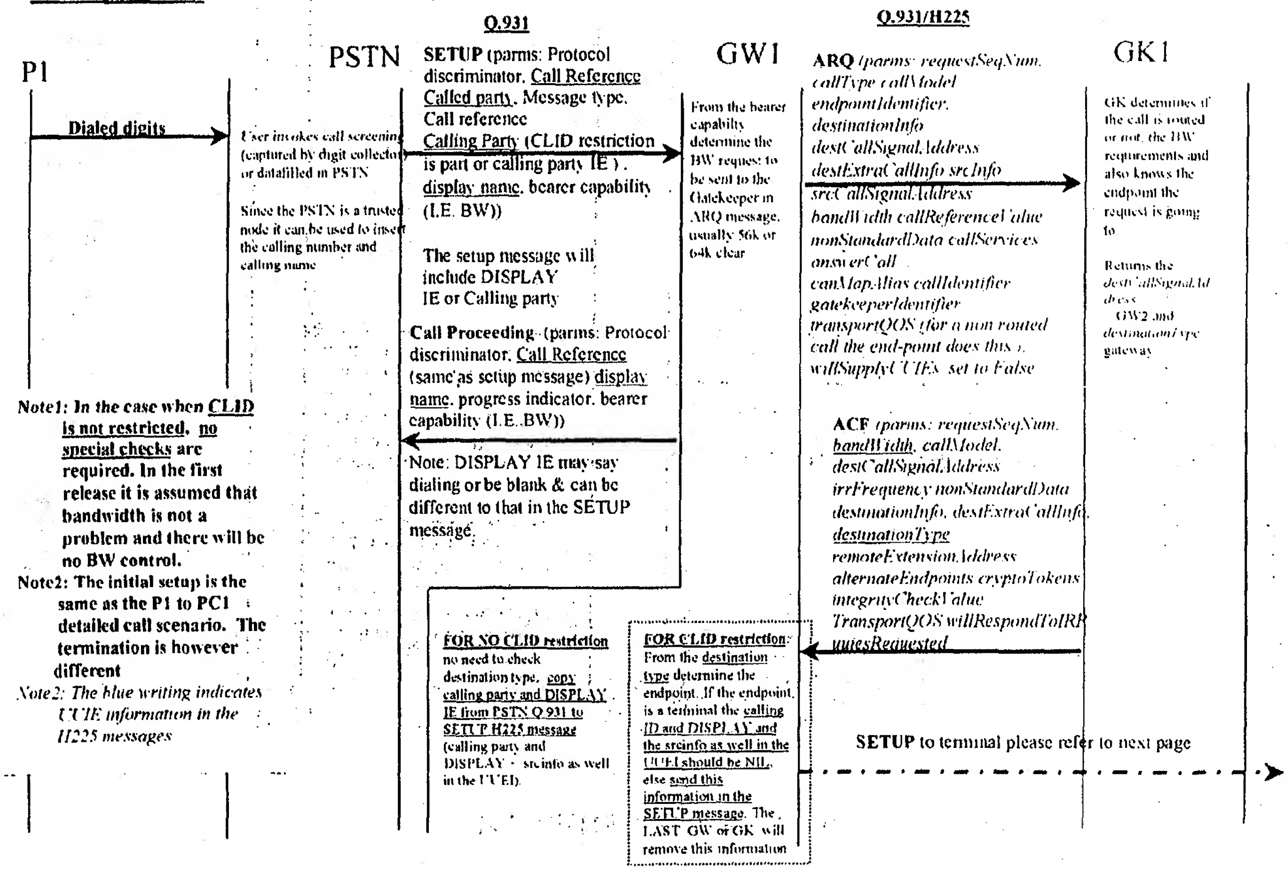
- If terminating endpoint is a terminal or MCU + CLID RESTRICTION in the calling party then GW leaves these fields blank
- If the no CLID restriction, OK to transfer fields
- If the case the endpoint is a intermediate node such as a GW or a GK & CLID restriction is requested then we have 4 options:
  - A) Transfer the fields and add a *callIndependentSupplementaryService APDU (Call Restriction APDU)* for call restriction (as defined in H450.1 ROS objects). This is the best way as we comply with H450 and H225 standards but requires work in the GW/GK (this implies Note1) and the last node in the call will remove the calling number and display. May also require work in the standards body.
  - B) Leave the fields blank as these are optional Q.931 fields anyway. This is the simplest method requiring no work. However, all this work is mote if the PC terminal vendors add user information into the UserIndication field.
  - C) Copy the CLID restriction as part of the Calling party IE, have standard modified to H.225+ (this would means standards work and is propriety to NT). May also require work in the standards body.
  - D) Use the User Indication field in the UUIE. Again this will require work in the GW.

P1 calls PC1 - Page 3

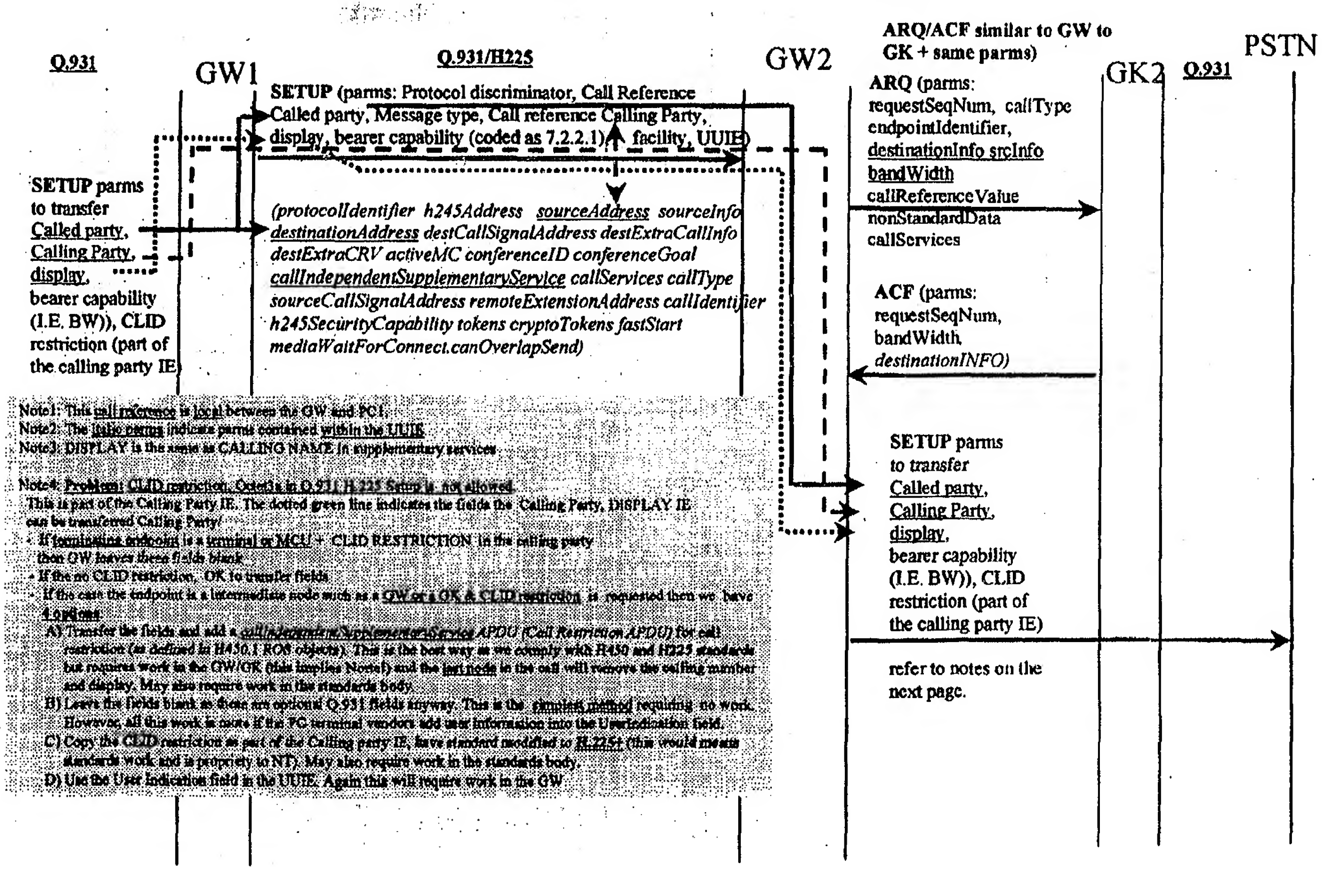


P1 PSTN1 calls P5 PSTN 2 - Page 1

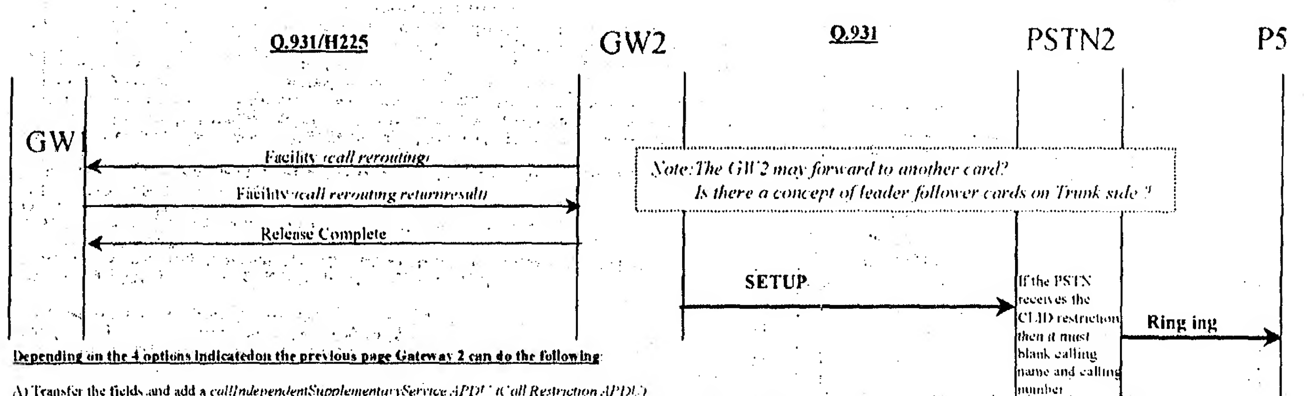
Call specifics: Also known as LONG DISTANCE BY-PASS.



P1 PSTN1 calls P5 PSTN 2 - Page 2



P1 PSTN1 calls P5 PSTN 2 - Page 3



Depending on the 4 options indicatedon the previous page Gateway 2 can do the following:

A) Transfer the fields and add a *callIndependentSupplementaryService* APDU (Call Restriction APDU)
- GW 2 has the corresponding APDU implemented and readds the CLID restriction field to the Q931 setup message (calling party IE) This is the most difficult of all the options but the most standards based.

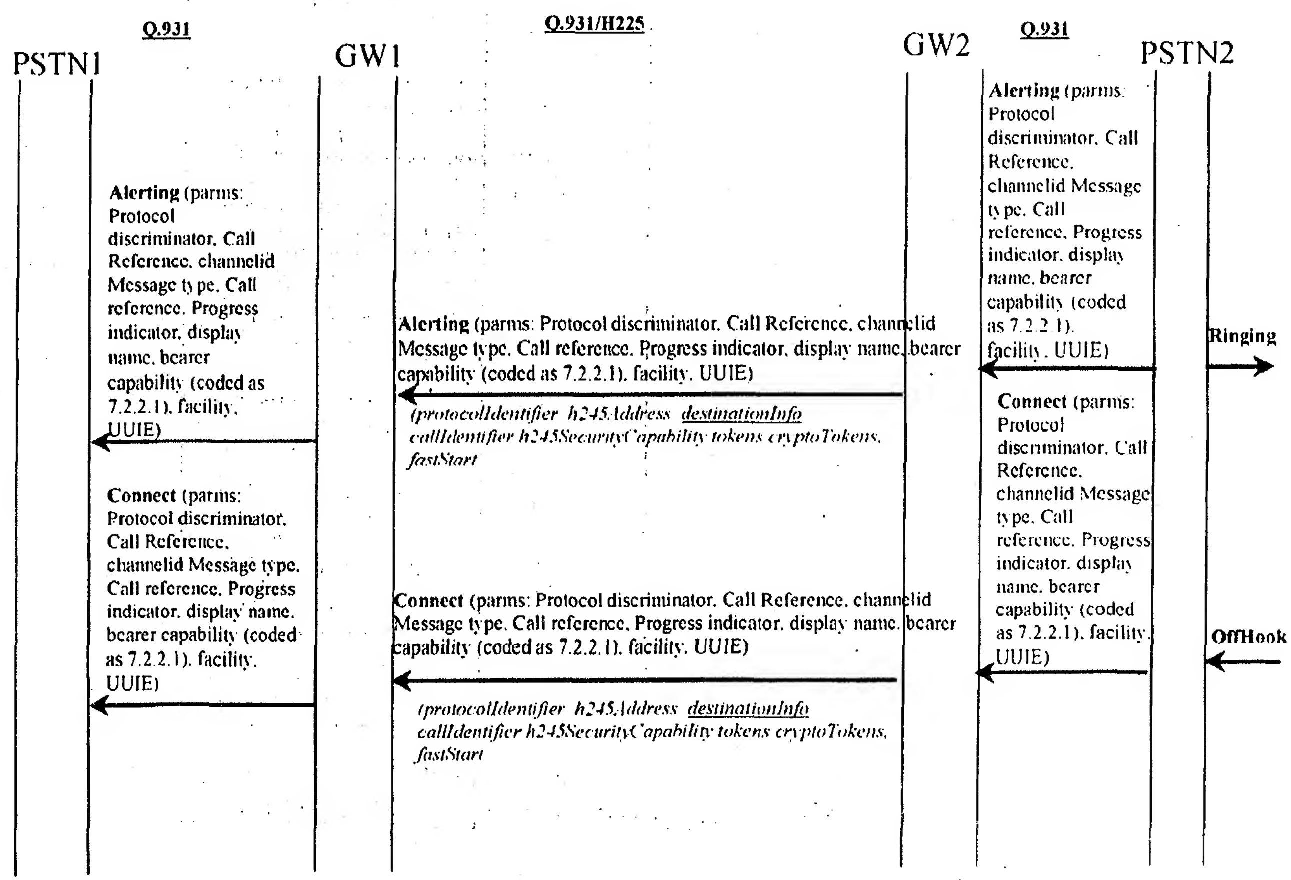
B) Leave the fields blank as these are optional Q.931 fields anyway. This is the simplest method requiring no work.
- No work on GW2. CLID restriction no required to be added ;

C) Copy the CLID restriction as part of the Calling party IE, have standard modified to H.225+
- Minimum work to copy fields fields across from H225 to Q931

D) Use the User Indication field in the UUIE. Again this will require work in the GW.
- Work required at the GW. Still no standards based and could be a limitation on the number of characters that can be placed in the UserIndication field.

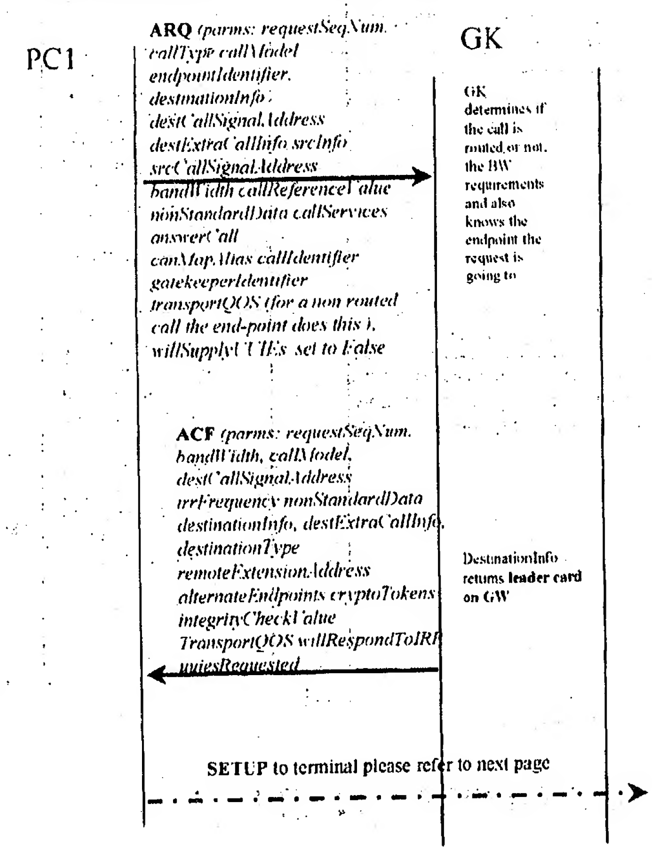
I would Recommend Option B for simplicity

P1 PSTN1 calls P5 PSTN 2 - Page 4

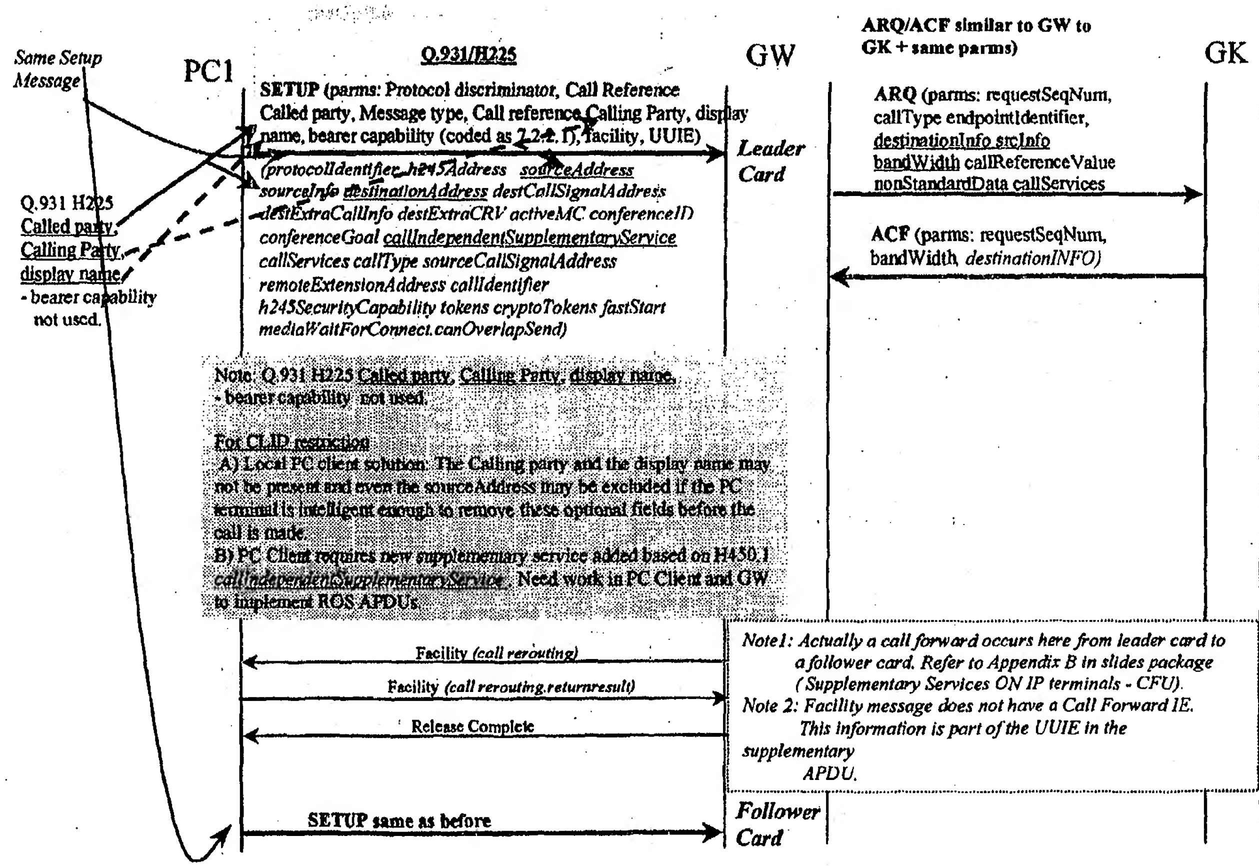


PC1 calls PC2 (IP terminal to IP terminal) via GW- Page 1

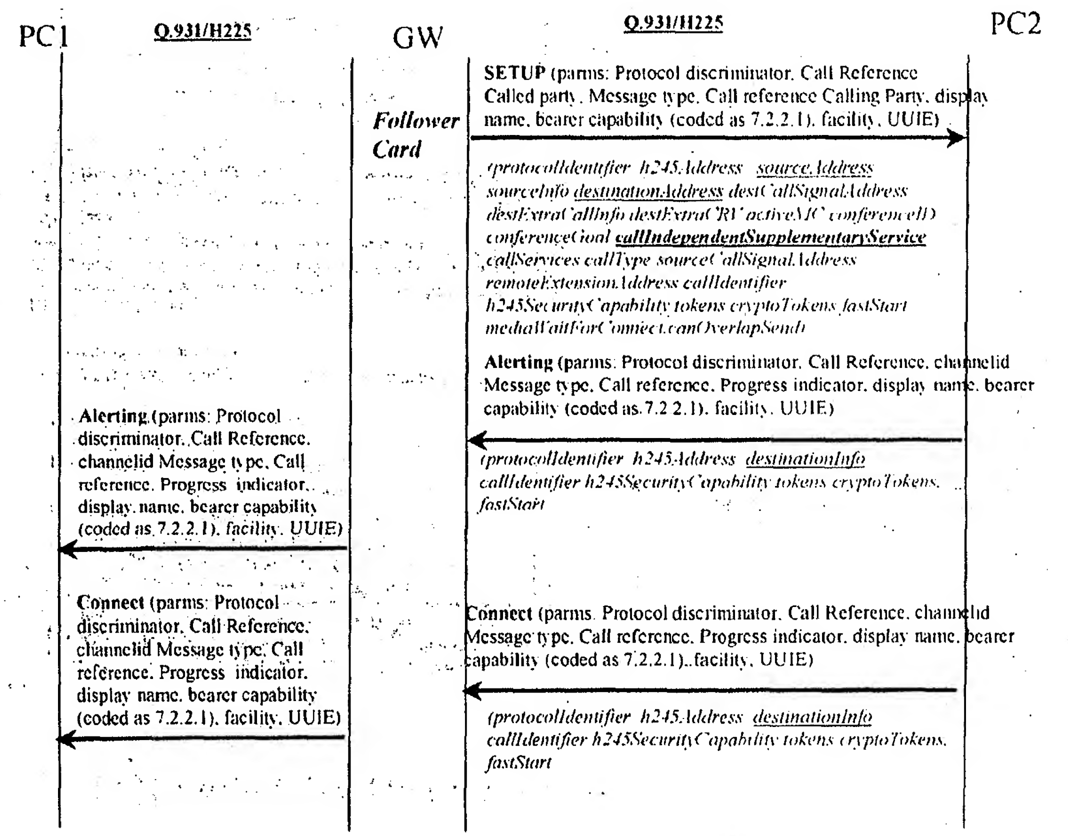
Call specifics: The GW is used to make use of Billing records software available in the MMCS.



PC1 calls PC2 via GW - Page 2

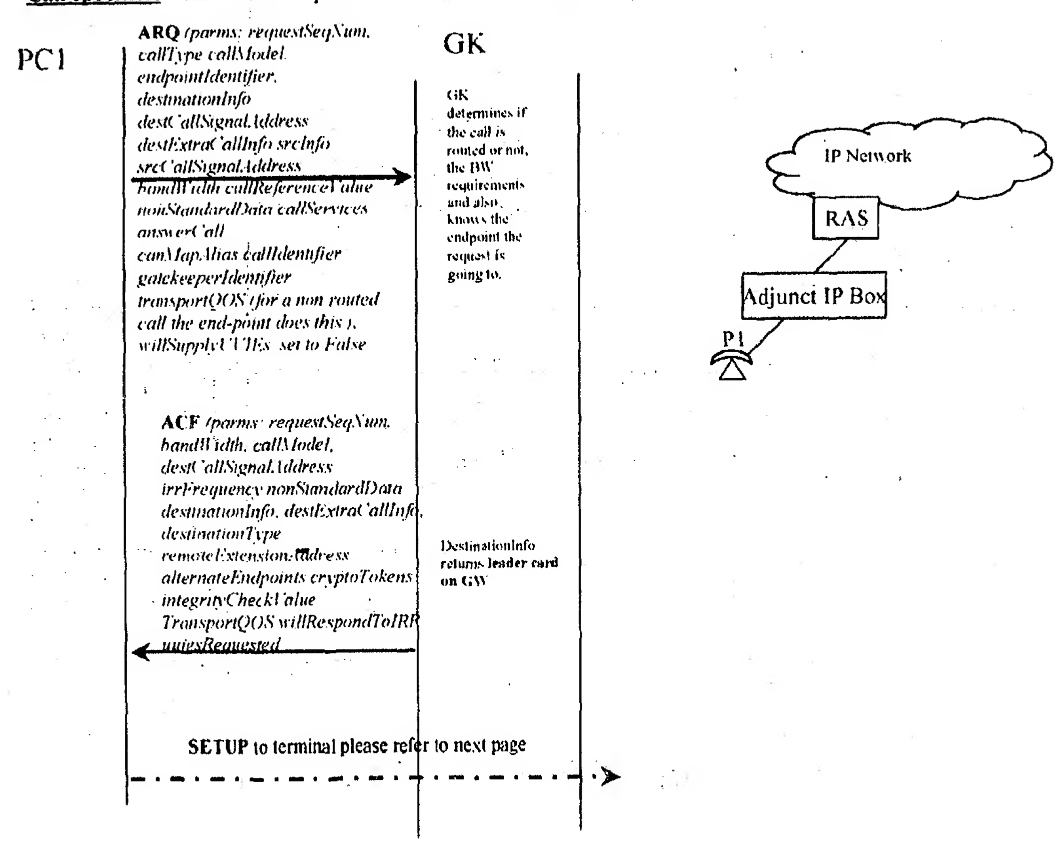


PC1 calls PC2 via GW - Page 3

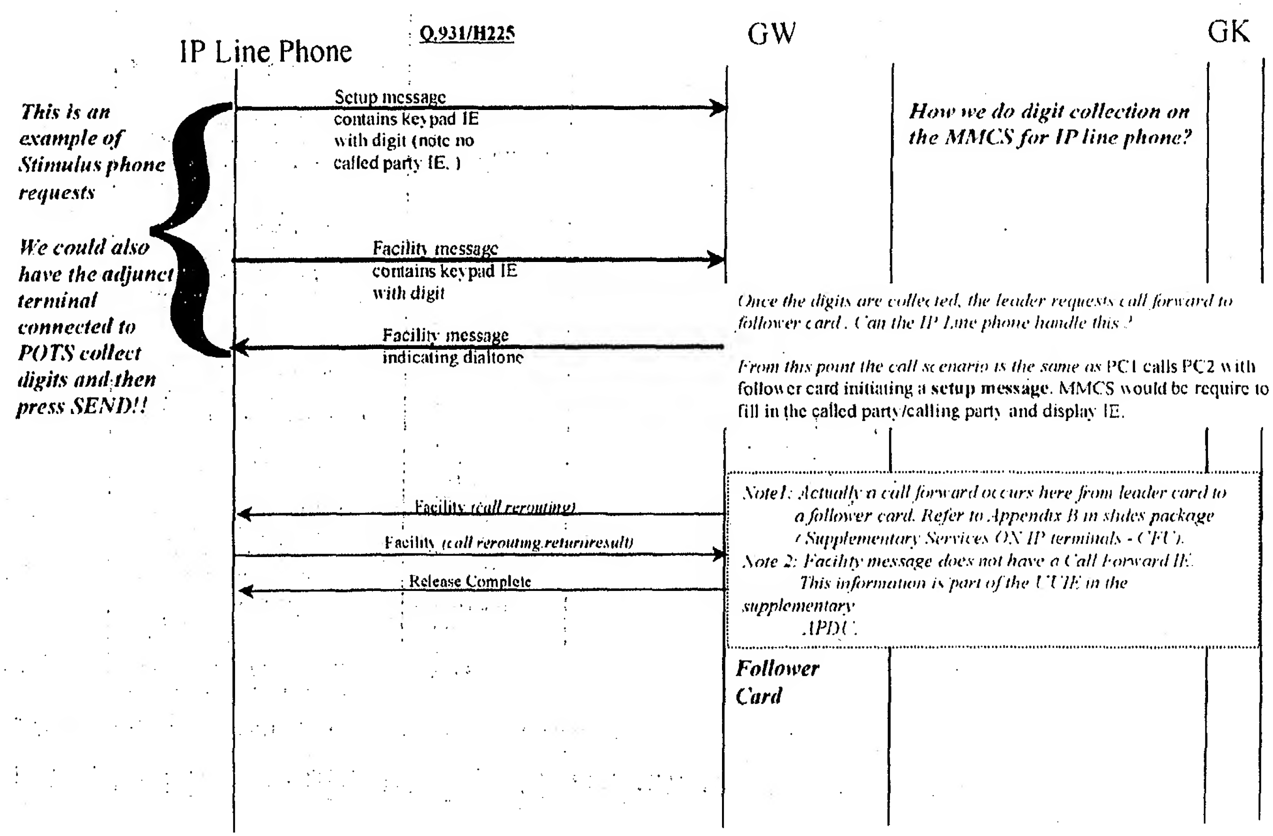


IP LINE Phone calls PC2 (IP terminal to IP terminal) via GW- Page 1

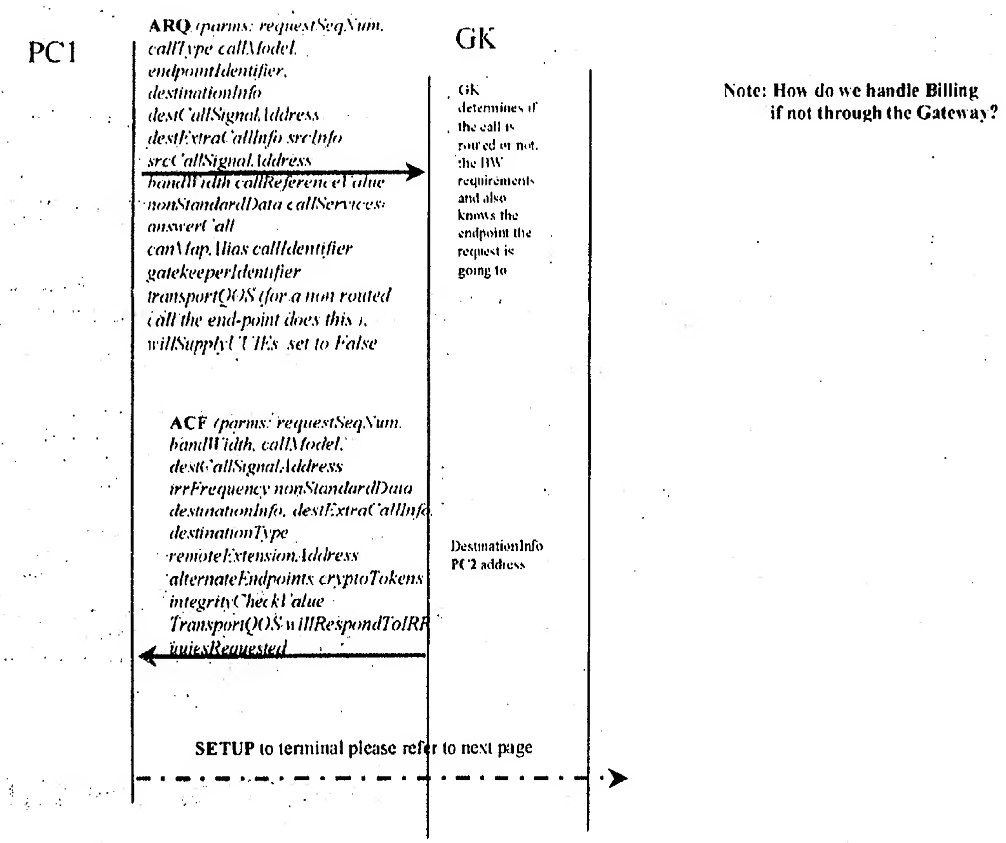
Call specifics: This is a POTS phone that is connected to an IP adjunct on the IP extranet



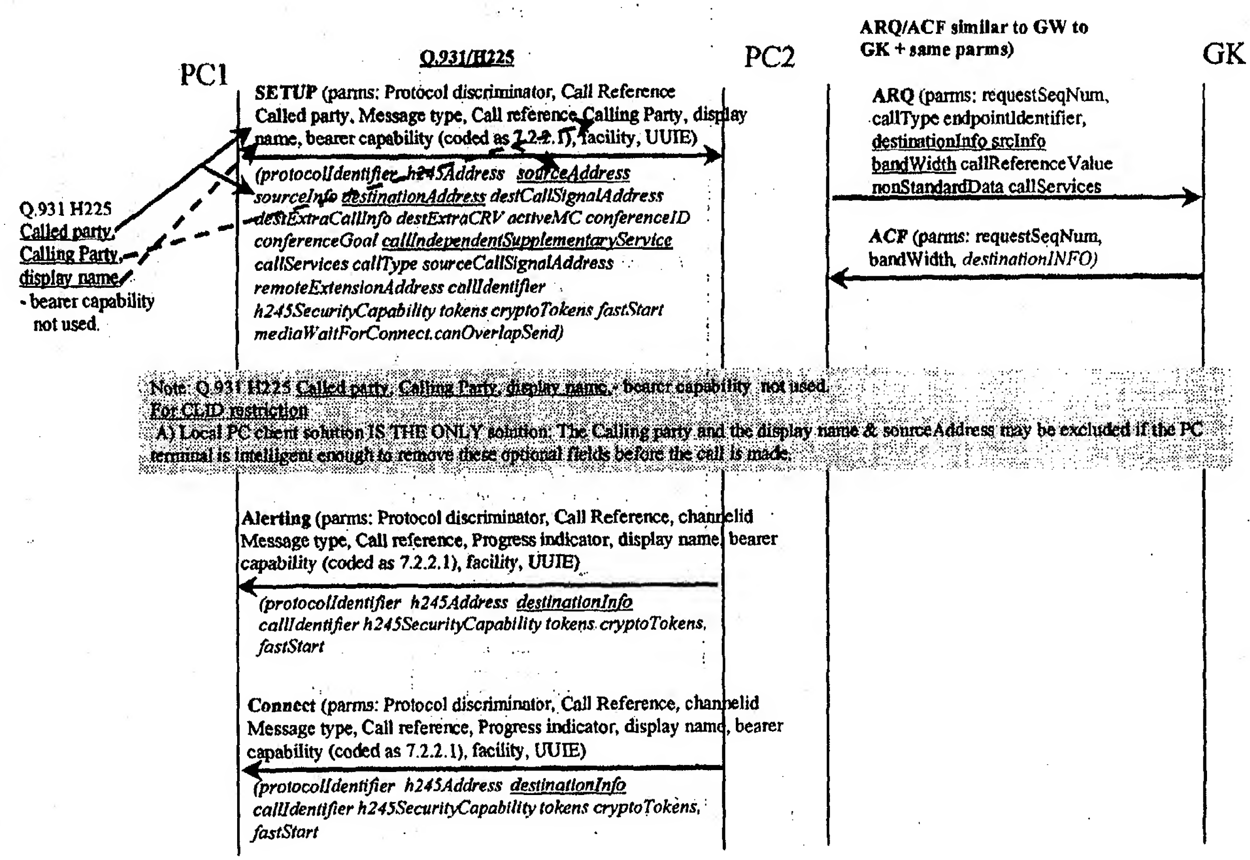
IP Line Phone calls PC2 via GW - Page 2



PC1 calls PC2 DIRECT - Page 1



PC1 calls PC2 Direct



Claims

1. A gateway for use between between an IP network and another network, the gateway being adapted to handle calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the gateway being further adapted to provide at least one supplementary service for calls to or from an IP terminal device.

2. The gateway according to claim 1, wherein the supplementary service is chosen from at least one of: originating restrictions;

   - a terminating restriction;
   - call forwarding;
   - calling line identification;
   - CLID restriction;
   - calling name display;
   - call transfer.

3. The gateway according to any previous claim, wherein the gateway is adapted to provide the supplementary service on a call between two IP terminal devices and/or to provide the supplementary service on a call between an IP terminal device and a terminal device connected to the other network.

4. The gateway according to any previous claim, wherein the gateway comprises a shared pool of ports on the line side which are usable for a connection to an IP terminal device.

5. The gateway according to any previous claim, wherein the gateway is adapted to dynamically associate an IP terminal device client's subscriber data with a call.

6. The gateway according to any previous claim, wherein the gateway is adapted to perform address resolution for calls to IP terminal devices.

7. The gateway according to any previous claim, wherein the gateway is integrated with a switch.

8. An IP network for connection to another network, the IP network being adapted for handling calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the network being further adapted to provide at least one supplementary service for calls to or from an IP terminal device.

9. The IP network according to claim 8, wherein the supplementary service is chosen from at least one of: originating restrictions;

   - a terminating restriction;
   - call forwarding;
   - calling line identification;
   - CLID restriction;
   - calling name display;
   - call transfer.

10. The IP network according to claim 8 or 9, wherein the network is adapted to provide the supplementary service on a call between two IP terminal devices and/or is adapted to provide the supplementary service on a call between an IP terminal device and a terminal device connected to the other network.

11. The IP network according to any of claims 8 to 10, wherein the network is adapted to dynamically associate an IP terminal device client's subscriber data with a call.

12. The IP network according to any of claims 8 to 11, wherein a voice call between two IP terminal devices without double encoding/decoding of the voice data.

13. The IP network according to any of claims 8 to 12, further comprising a gateway, the gateway being adapted to

provide the supplementary service.

14. The IP network according to any of claims 8 to 13, wherein the gateway comprises a shared pool of ports on the line side which are usable for a connection to an IP terminal device.

15. The IP network according to any of claims 8 to 14, wherein the network is adapted to route call control signals for a call between two IP terminal devices through the gateway or the IP network is adapted to route call control signals for a call between two IP terminal devices through the IP network and call signaling though the gateway.

16. A method of operating a gateway between an IP network and another network, the gateway being adapted to handle calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the method including the step of providing at least one supplementary service for calls to or from an IP terminal device.

17. The method according to claim 16, wherein the supplementary service is chosen from at least one of:
originating restrictions;

- a terminating restriction;
- call forwarding;
- calling line identification;
- CLID restriction;
- calling name display;
- call transfer.

18. The method according to claim 16 or 17, wherein the supplementary service is provided on a call between two IP terminal devices and/or is provided on a call between an IP terminal device and a terminal device connected to the other network.

19. The method according to any of the claims 16 to 18, further comprising the step of dynamically associating an IP terminal device client's subscriber data with a call.

20. A method of operating an IP network connected to another network, the IP network handling calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the method comprising the step of providing at least one supplementary service for calls to or from an IP terminal device.

21. The method according to claim 20, wherein the supplementary service is chosen from at least one of:
originating restrictions;

- a terminating restriction;
- call forwarding;
- calling line identification;
- CLID restriction;
- calling name display;
- call transfer.

22. The method according to claim 20 or 21, further comprising the step of dynamically associating an IP terminal device client's subscriber data with a call.

23. The method according to any of claims 20 to 22, further comprising the step of routing a voice call between two IP terminal devices without double encoding/decoding of the voice data.

24. A gateway between an IP network and another network, the gateway handling calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the gateway comprising a shared pool of ports on the line side which are usable for a connection to an IP terminal device.

25. The gateway according to claim 24, wherein the gateway is adpated to dynamically associate an IP terminal device

client's subscriber data with a call.

26. A method of operating IP network having a gateway between the IP network and another network, the gateway handling calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the method including the steps of:
routing call signaling for a call between two IP terminals though the gateway and routing voice traffic between two IP terminals without pasing via the gateway.

27. An IP network having a gateway between an IP network and another network, the gateway handling calls between IP terminal devices connected to the IP network as well as calls between an IP terminal device and a terminal device connected to the other network, the method including the steps of:
routing call signaling for a call between two IP terminals though the gateway and routing voice traffic between two IP terminals without pasing via the gateway.

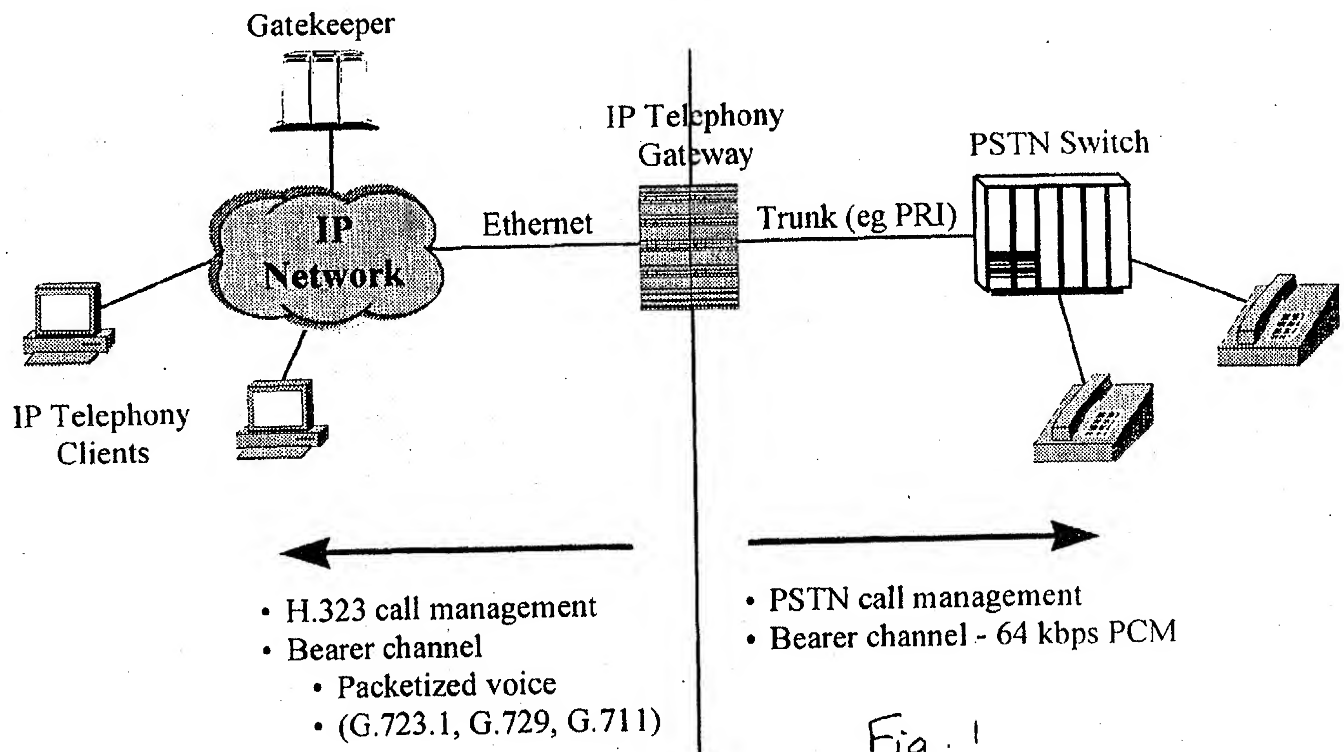

Gatekeeper
IP Telephony Gateway
PSTN Switch
IP Network
Ethernet
Trunk (eg PRI)
IP Telephony Clients
• H.323 call management
• Bearer channel
• Packetized voice
• (G.723.1, G.729, G.711)
• PSTN call management
• Bearer channel - 64 kbps PCM

Fig. 1

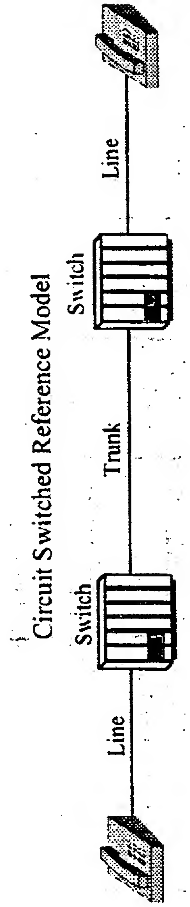


Fig. 2A

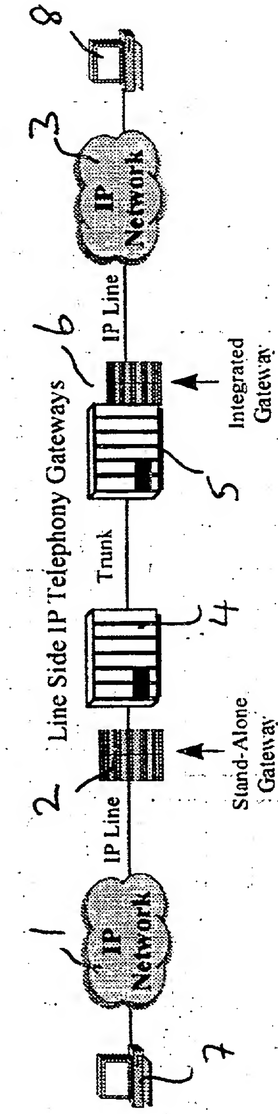


Fig. 2B

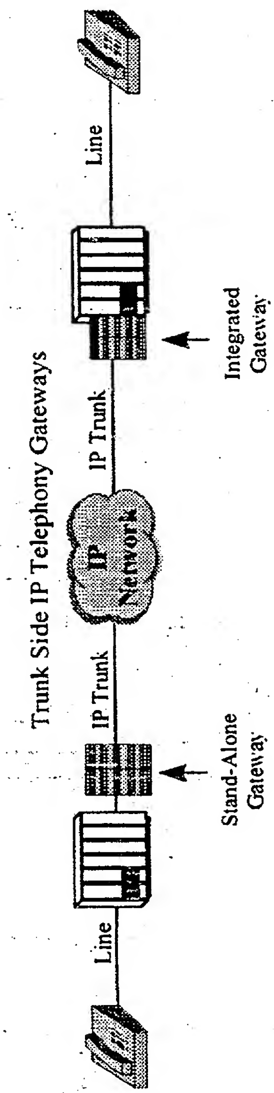


Fig. 2C

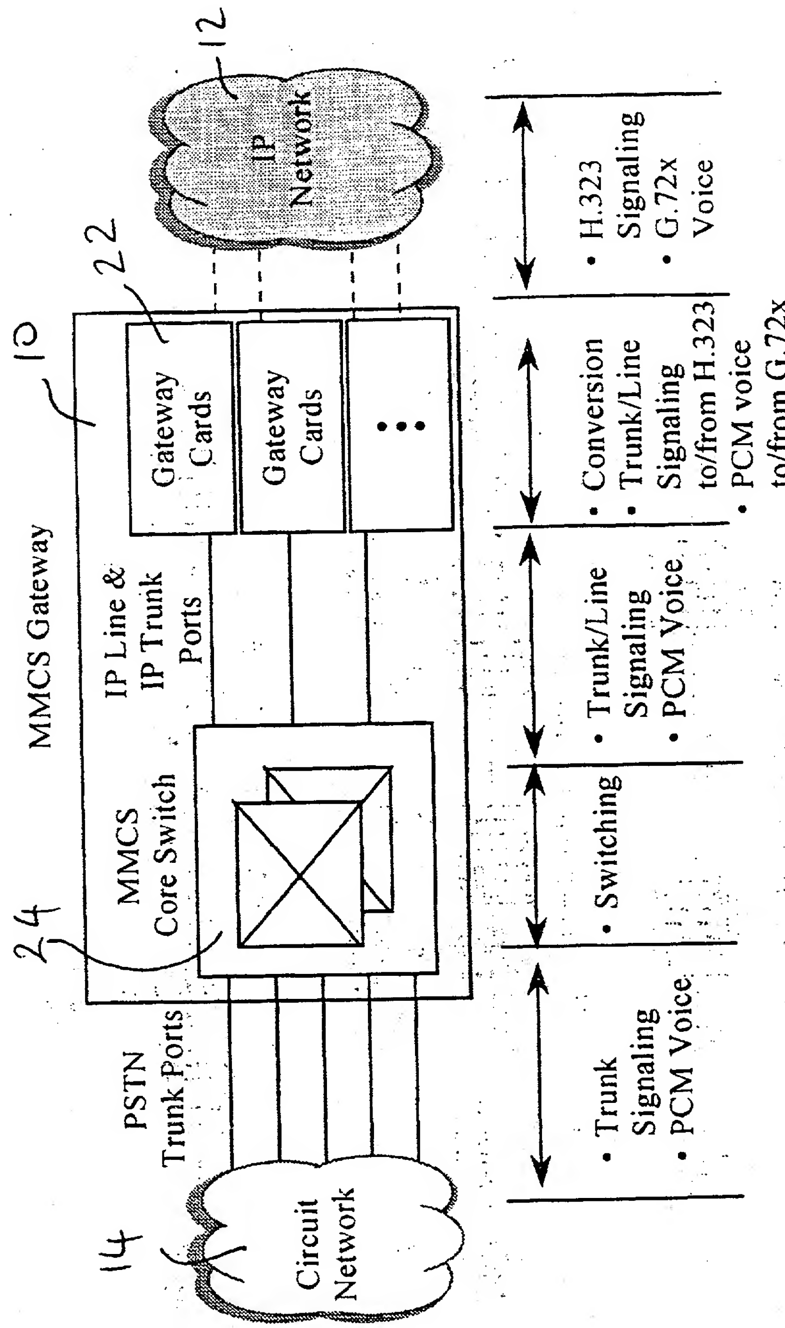

12
IP Network
22
10
MMCS Gateway
Gateway Cards
Gateway Cards
IP Line & IP Trunk Ports
MMCS Core Switch
24
PSTN Trunk Ports
14
Circuit Network
• H.323 Signaling
• G.72x Voice
• Conversion
• Trunk/Line Signaling to/from H.323
• PCM voice to/from G.72x
• Trunk/Line Signaling
• PCM Voice
• Switching
• Trunk Signaling
• PCM Voice

Fig. 3

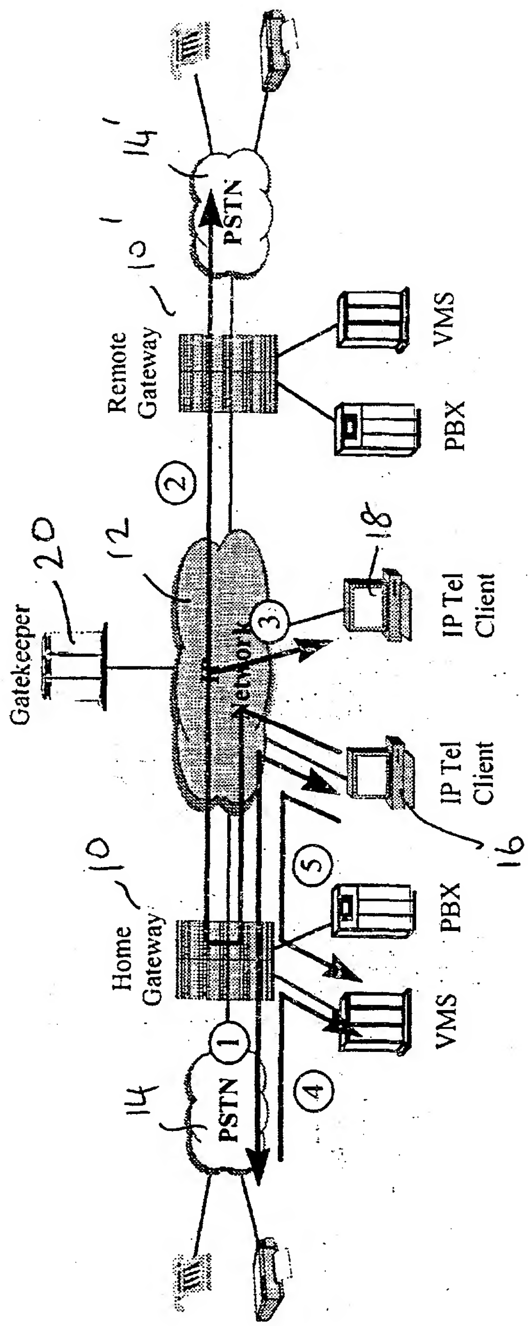

Gatekeeper
20
12
Network
Remote Gateway
10'
PSTN
14'
Home Gateway
10
PSTN
14
IP Tel Client
16
IP Tel Client
18
PBX
VMS
PBX
VMS
1
2
3
4
5

Fig. 4A

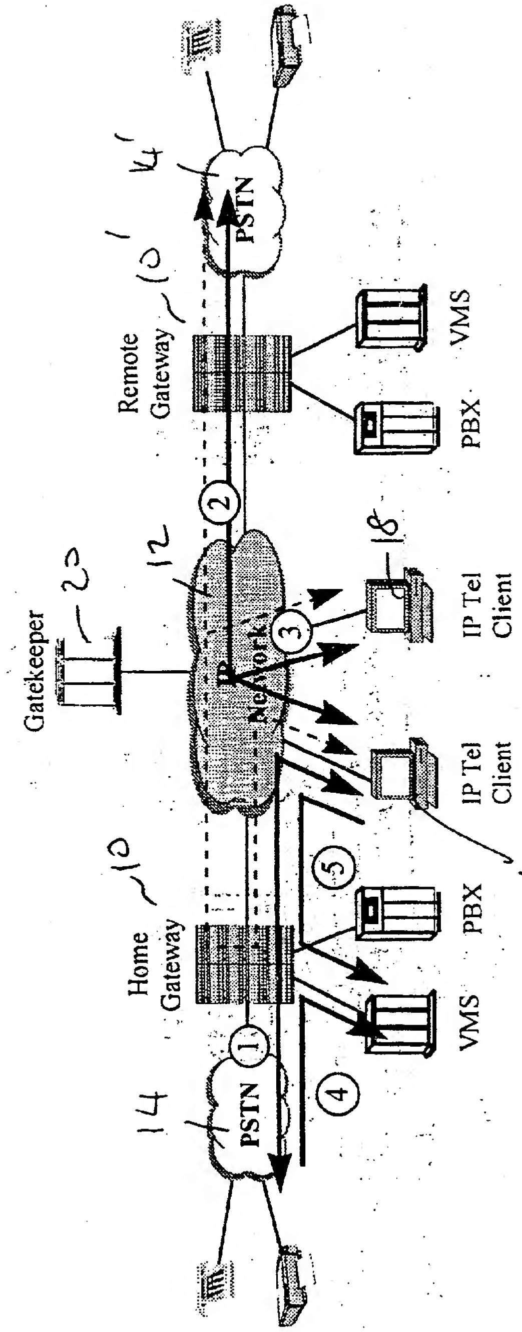

Gatekeeper
20
12
Network
2
Remote Gateway
10'
PSTN
4'
PBX
VMS
3
18
IP Tel Client
IP Tel Client
16
Home Gateway
10
5
PBX
VMS
1
4
PSTN
14

Fig. 4B

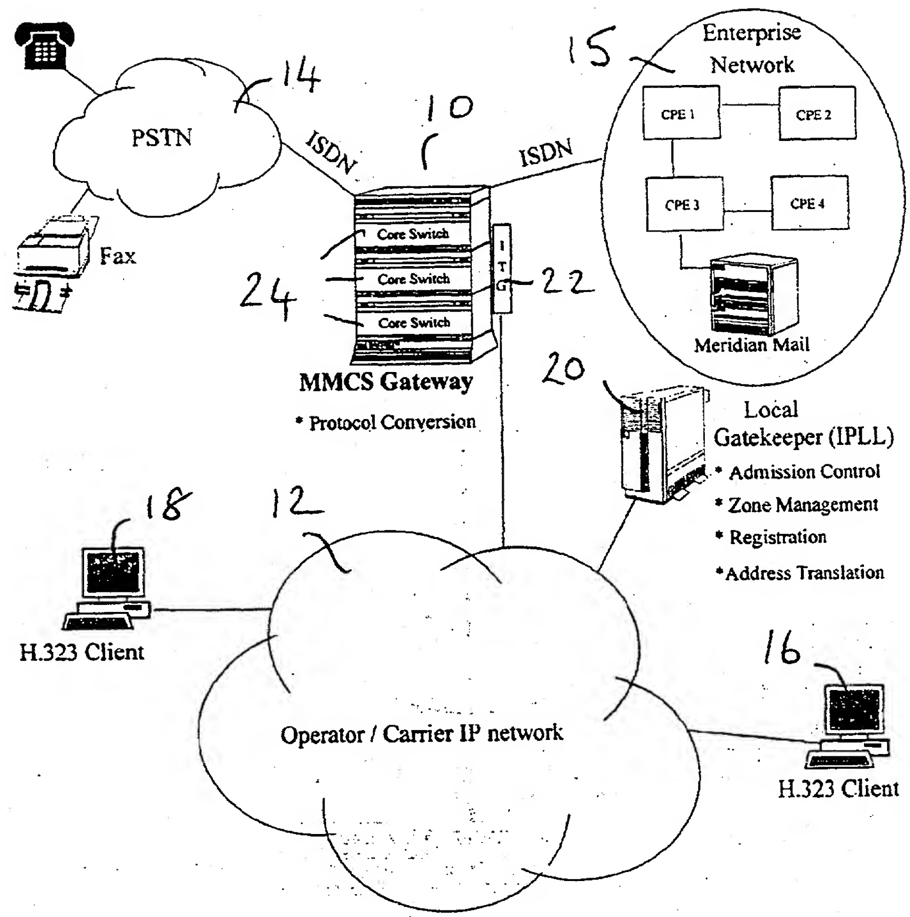

Enterprise Network
15
CPE 1
CPE 2
CPE 3
CPE 4
Meridian Mail
PSTN
14
ISDN
10
ISDN
Fax
Core Switch
Core Switch
Core Switch
I
T
G
22
24
MMCS Gateway
* Protocol Conversion
20
Local Gatekeeper (IPLL)
* Admission Control
* Zone Management
* Registration
*Address Translation
18
12
H.323 Client
16
Operator / Carrier IP network
H.323 Client

Fig. 5

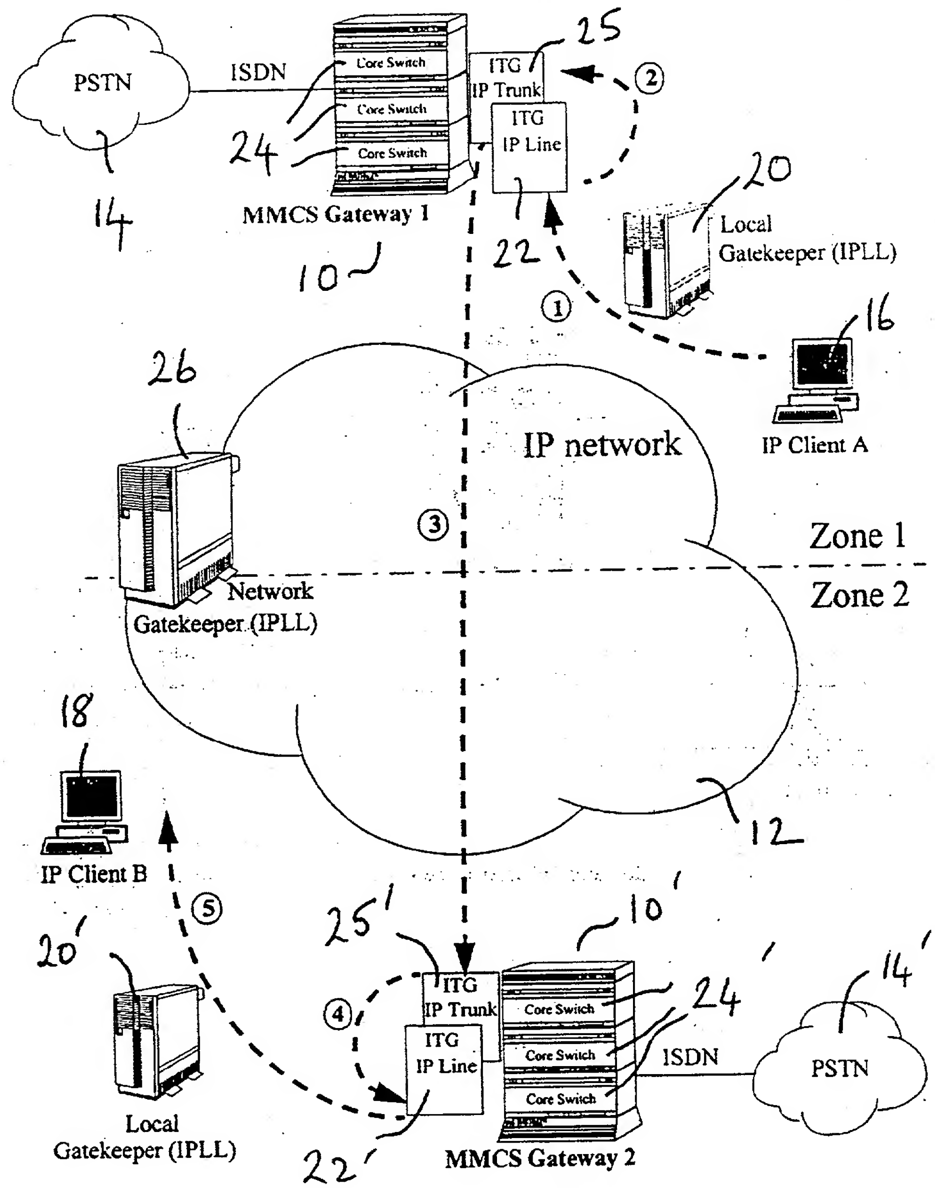

PSTN
ISDN
Core Switch
Core Switch
Core Switch
ITG
IP Trunk
ITG
IP Line
25
2
24
14
MMCS Gateway 1
10
22
20
Local
Gatekeeper (IPLL)
1
16
IP Client A
26
IP network
3
Zone 1
Zone 2
Network
Gatekeeper (IPLL)
18
12
IP Client B
5
25'
10'
20'
ITG
IP Trunk
ITG
IP Line
4
Core Switch
Core Switch
Core Switch
24'
14'
ISDN
PSTN
Local
Gatekeeper (IPLL)
22'
MMCS Gateway 2

Fig. 6

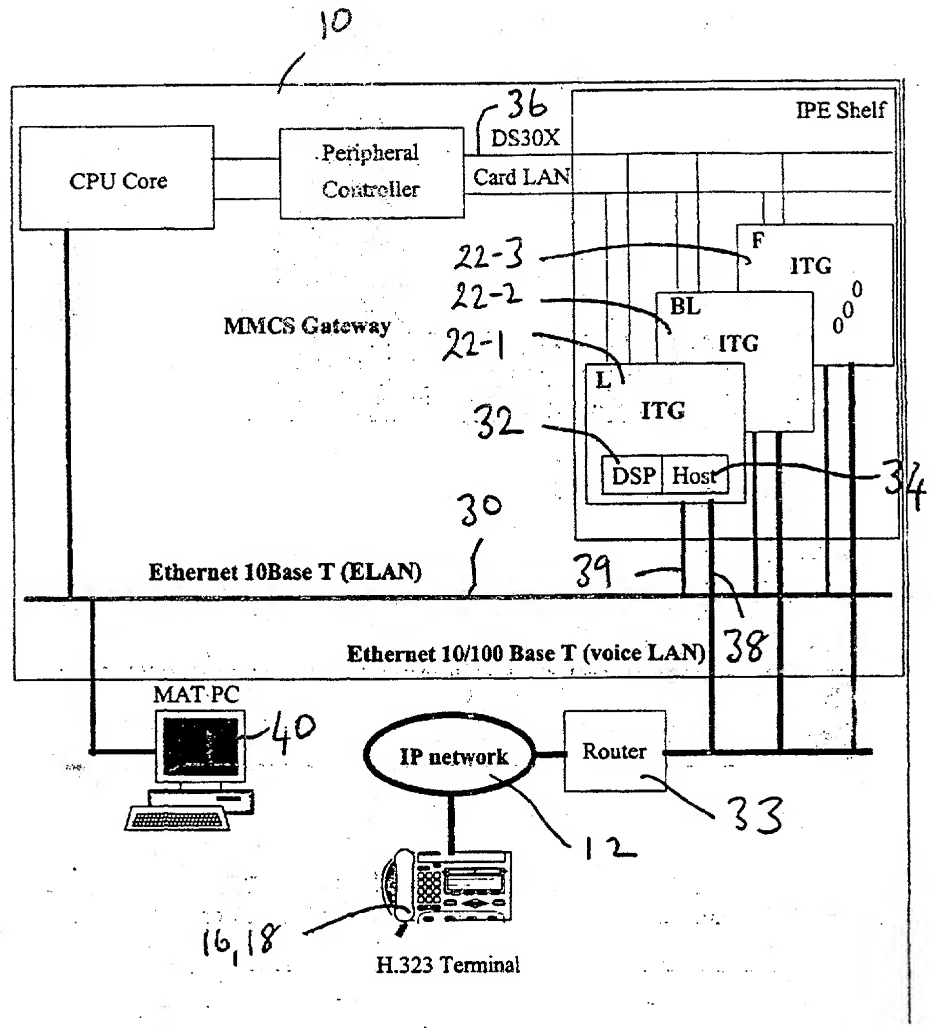

10
CPU Core
Peripheral
Controller
36
DS30X
Card LAN
IPE Shelf
22-3
22-2
22-1
F
ITG
BL
ITG
L
ITG
MMCS Gateway
32
DSP
Host
34
30
Ethernet 10Base T (ELAN)
39
38
Ethernet 10/100 Base T (voice LAN)
MAT PC
40
IP network
Router
33
12
16,18
H.323 Terminal

Fig. 7

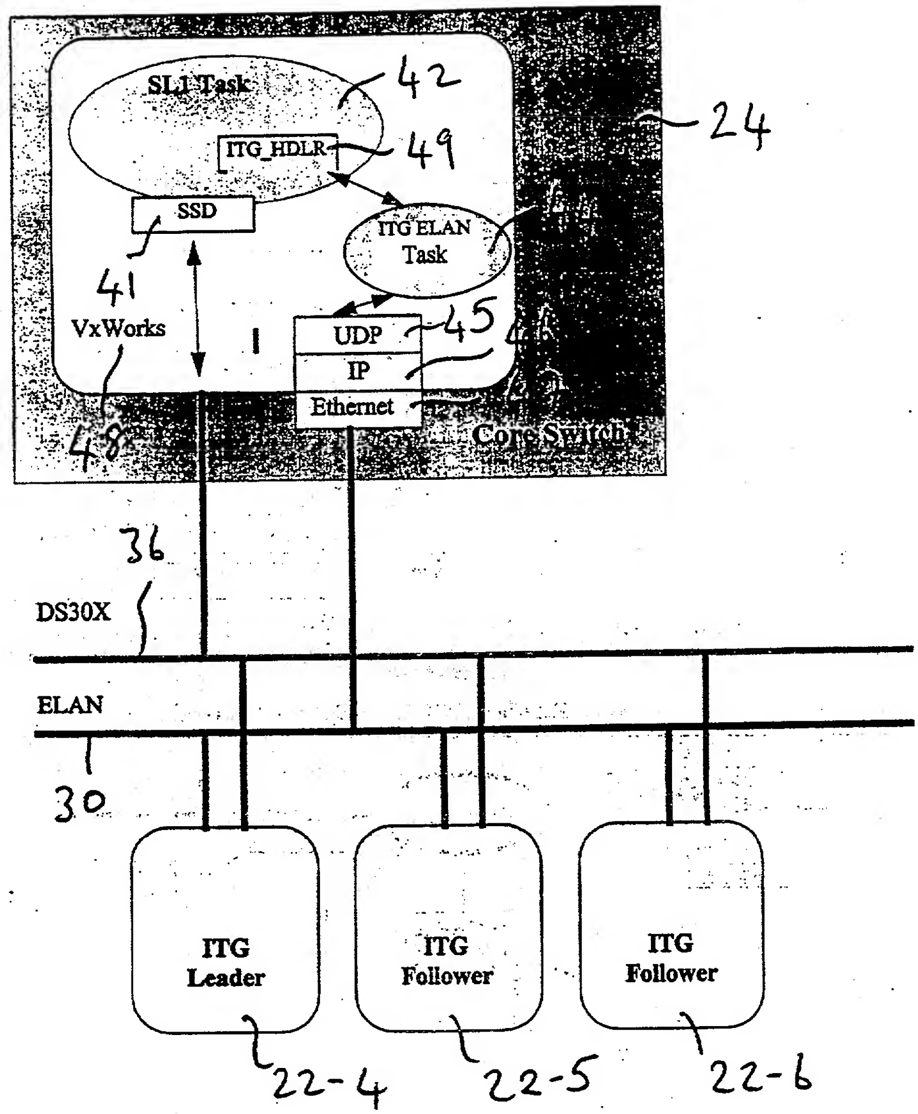

SL1 Task
42
ITG_HDLR
49
SSD
ITG ELAN Task
24
41
VxWorks
UDP
45
IP
Ethernet
48
Core Switch
36
DS30X
ELAN
30
ITG Leader
ITG Follower
ITG Follower
22-4
22-5
22-6

Fig. 8

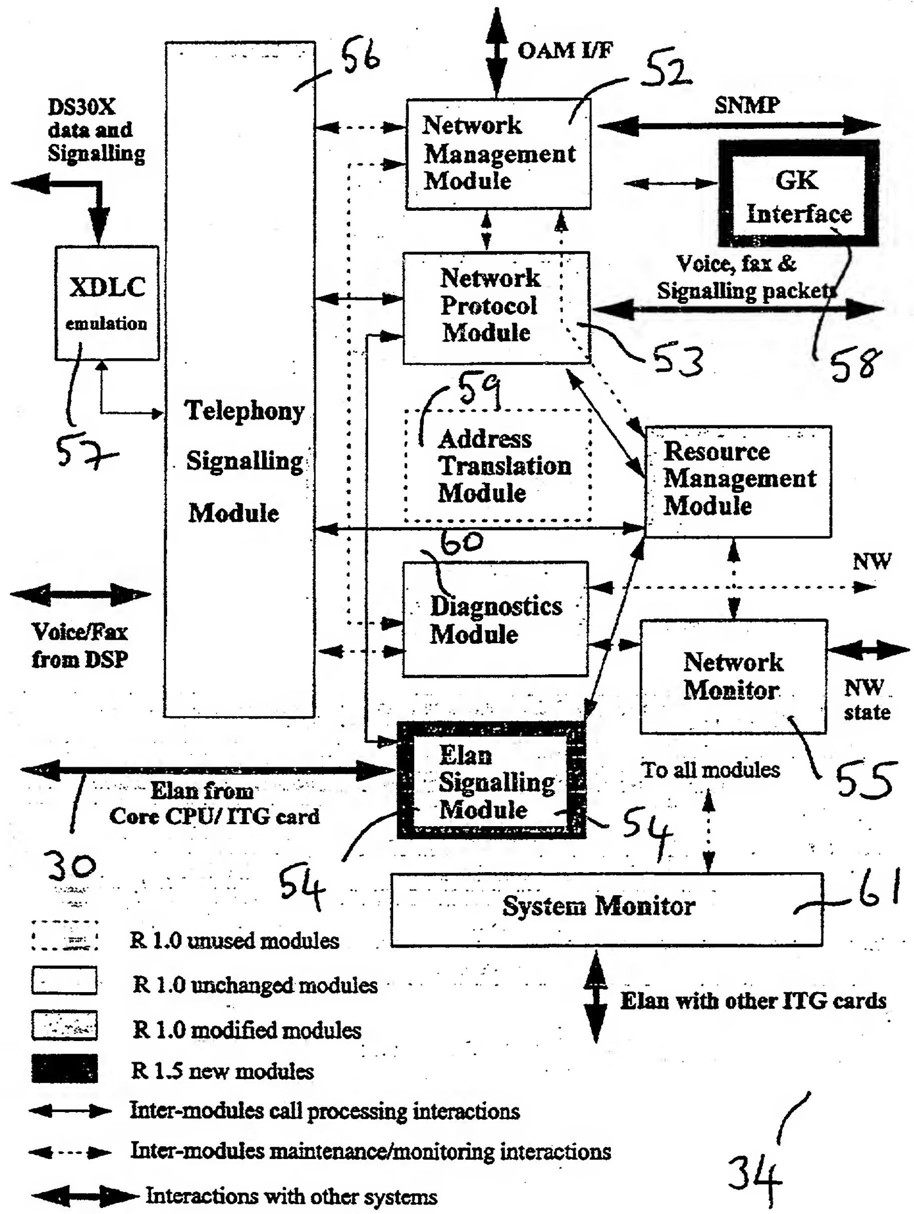

OAM I/F
52
56
DS30X data and Signalling
Network Management Module
SNMP
GK Interface
XDLC emulation
Network Protocol Module
Voice, fax & Signalling packets
53
58
59
Telephony Signalling Module
Address Translation Module
Resource Management Module
57
60
NW
Diagnostics Module
Voice/Fax from DSP
Network Monitor
NW state
Elan Signalling Module
Elan from Core CPU/ ITG card
To all modules
55
54
30
54
System Monitor
61
R 1.0 unused modules
R 1.0 unchanged modules
R 1.0 modified modules
R 1.5 new modules
Elan with other ITG cards
Inter-modules call processing interactions
Inter-modules maintenance/monitoring interactions
Interactions with other systems
34

Fig. 9

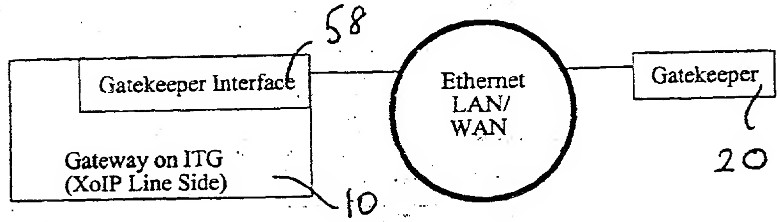

58
Gatekeeper Interface
Ethernet
LAN/
WAN
Gatekeeper
20
Gateway on ITG
(XoIP Line Side)
10

Fig. 10

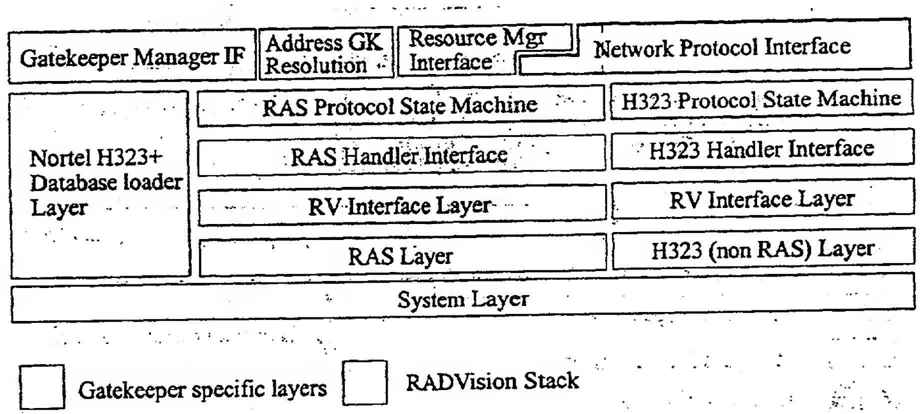

Gatekeeper Manager IF
Address GK Resolution
Resource Mgr Interface
Network Protocol Interface
Nortel H323+ Database loader Layer
RAS Protocol State Machine
H323 Protocol State Machine
RAS Handler Interface
H323 Handler Interface
RV Interface Layer
RV Interface Layer
RAS Layer
H323 (non RAS) Layer
System Layer
Gatekeeper specific layers
RADVision Stack

Fig. 11

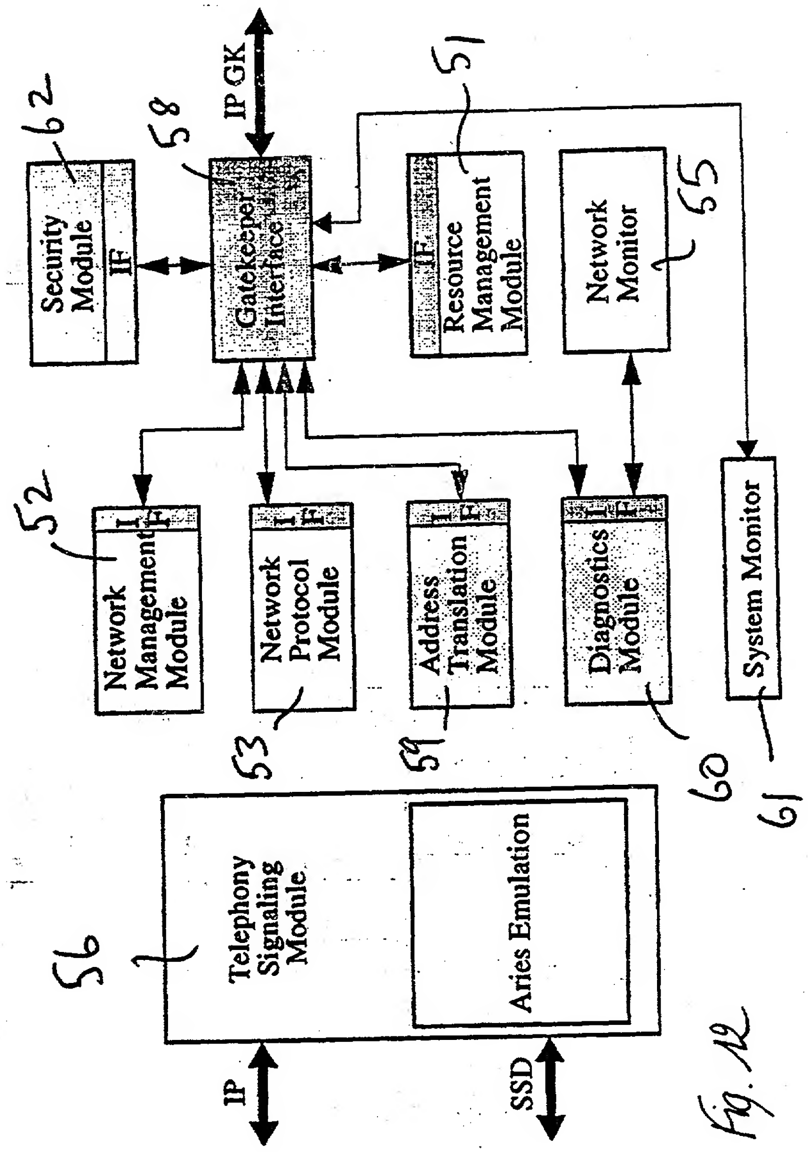
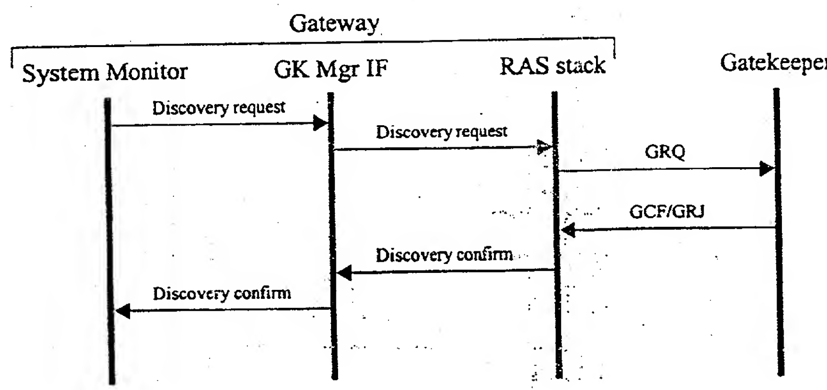
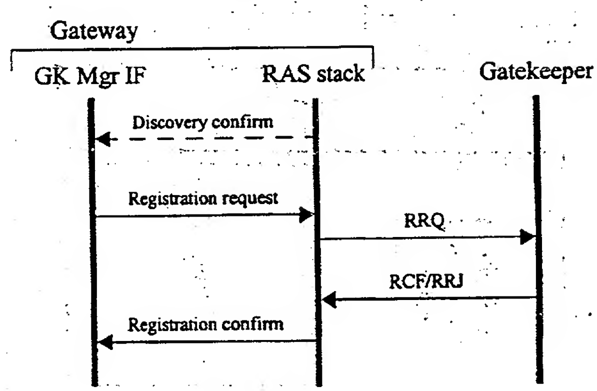

Security Module
IF
62
58
IP GK
Gatekeeper Interface
51
IF
Resource Management Module
Network Monitor
55
Network Management Module
IF
52
Network Protocol Module
IF
53
Address Translation Module
IF
59
Diagnostics Module
IF
60
System Monitor
61
Telephony Signaling Module
56
Aries Emulation
IP
SSD

Fig. 12



Gateway
System Monitor
GK Mgr IF
RAS stack
Gatekeeper
Discovery request
Discovery request
GRQ
GCF/GRJ
Discovery confirm
Discovery confirm

Fig. 13



Gateway
GK Mgr IF
RAS stack
Gatekeeper
Discovery confirm
Registration request
RRQ
RCF/RRJ
Registration confirm

Fig. 14

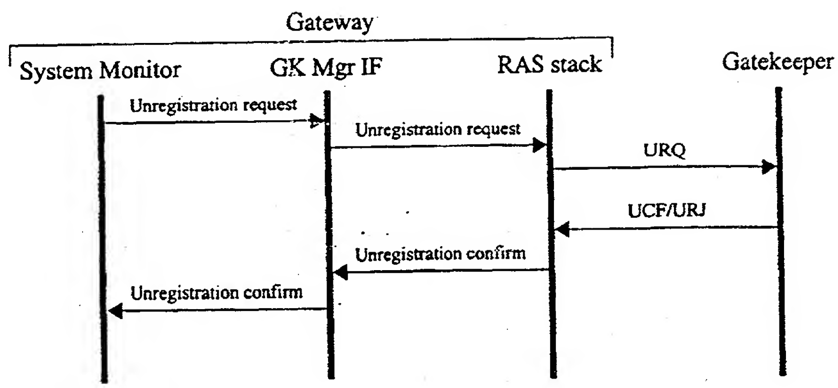

Gateway
System Monitor
GK Mgr IF
RAS stack
Gatekeeper
Unregistration request
Unregistration request
URQ
UCF/URJ
Unregistration confirm
Unregistration confirm

Fig. 15

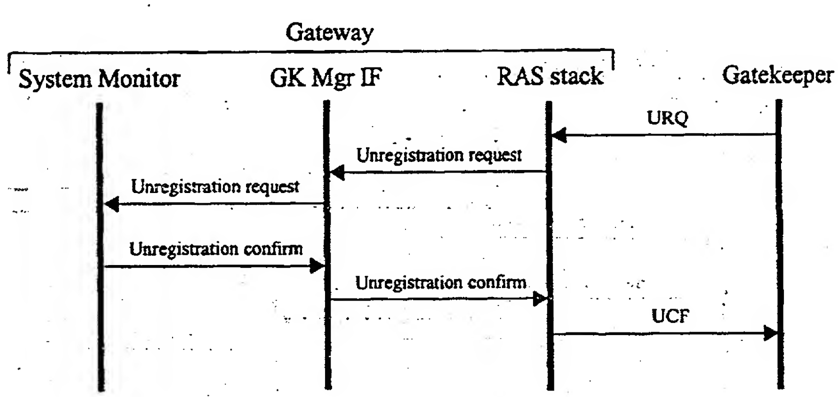

Gateway
System Monitor
GK Mgr IF
RAS stack
Gatekeeper
URQ
Unregistration request
Unregistration request
Unregistration confirm
Unregistration confirm
UCF

Fig. 16

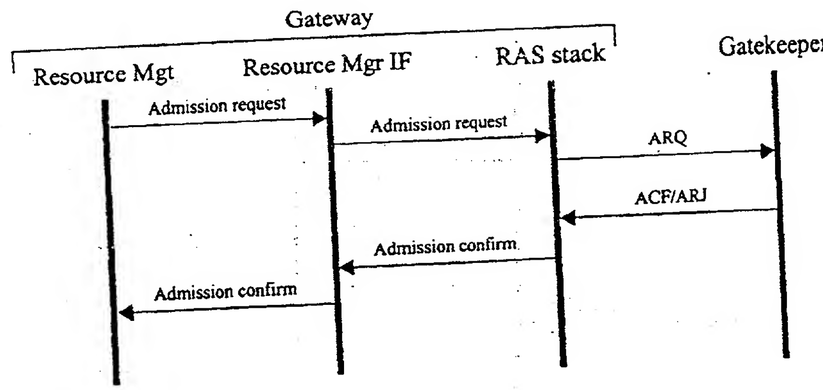

Gateway
Resource Mgt
Resource Mgr IF
RAS stack
Gatekeeper
Admission request
Admission request
ARQ
ACF/ARJ
Admission confirm
Admission confirm

Fig. 17

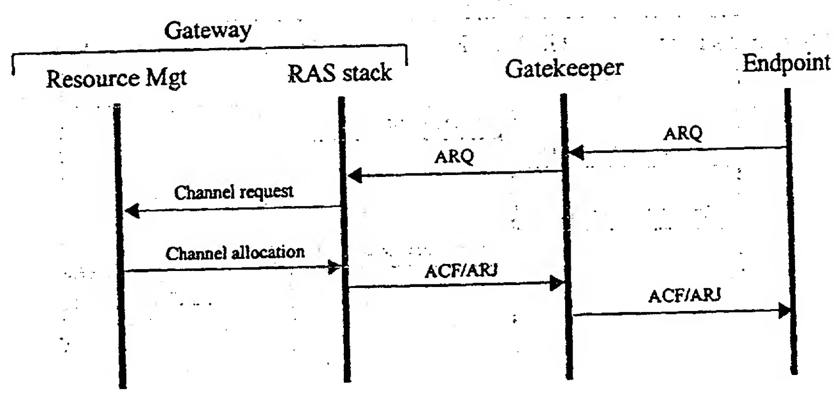

Gateway
Resource Mgt
RAS stack
Gatekeeper
Endpoint
ARQ
ARQ
Channel request
Channel allocation
ACF/ARJ
ACF/ARJ

Fig. 18

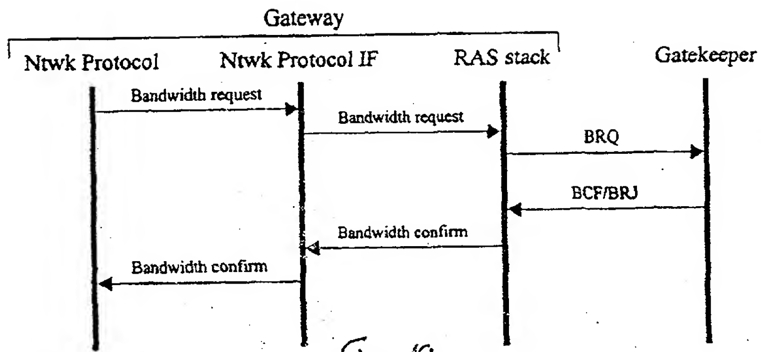


Fig. 19

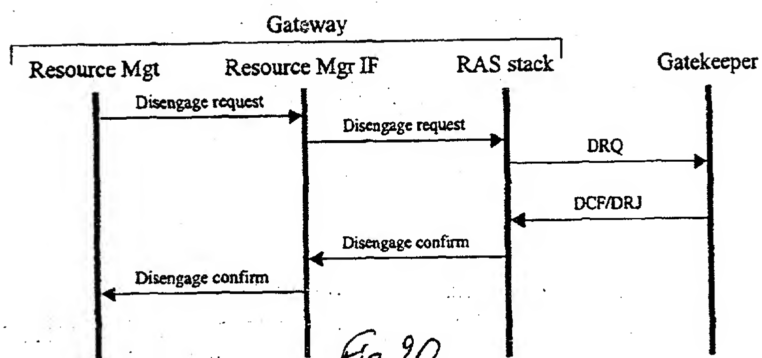


Fig. 20

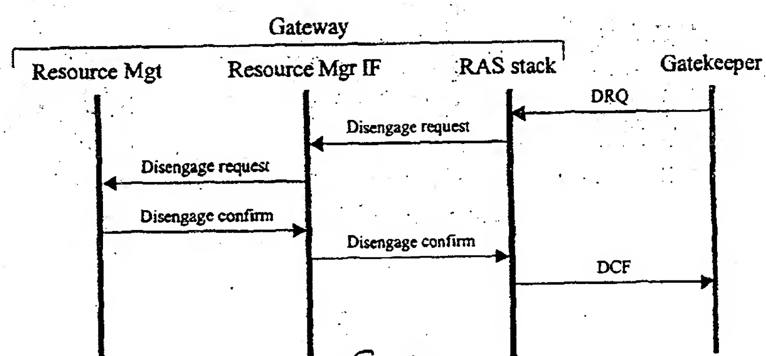
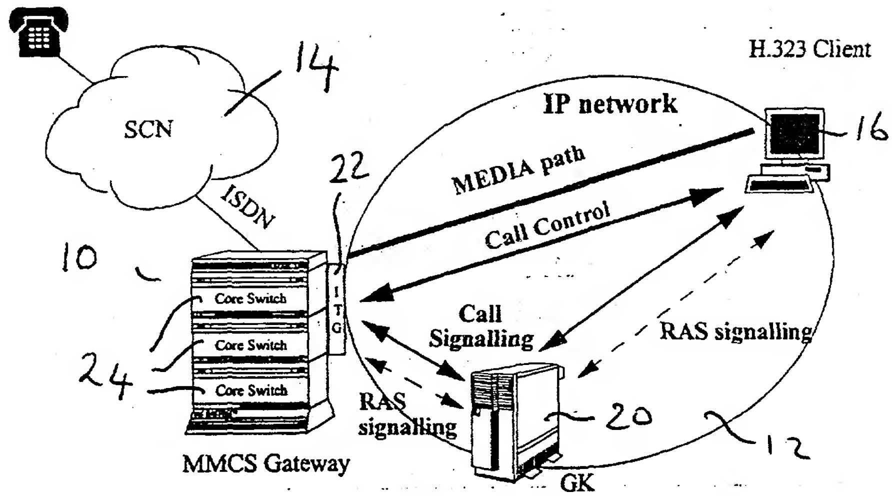
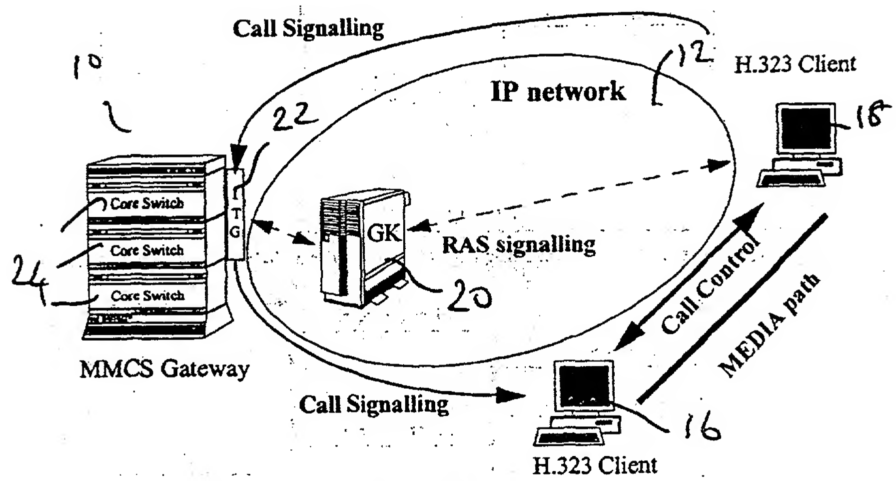


Fig. 21



H.323 Client
14
SCN
IP network
16
MEDIA path
22
ISDN
Call Control
10
Core Switch
Core Switch
Core Switch
I
T
G
Call
Signalling
RAS signalling
24
RAS
signalling
20
12
MMCS Gateway
GK

Fig. 22



Call Signalling
10
12
H.323 Client
IP network
22
18
Core Switch
Core Switch
Core Switch
I
T
G
GK
RAS signalling
24
20
Call Control
MEDIA path
MMCS Gateway
Call Signalling
16
H.323 Client

Fig. 24

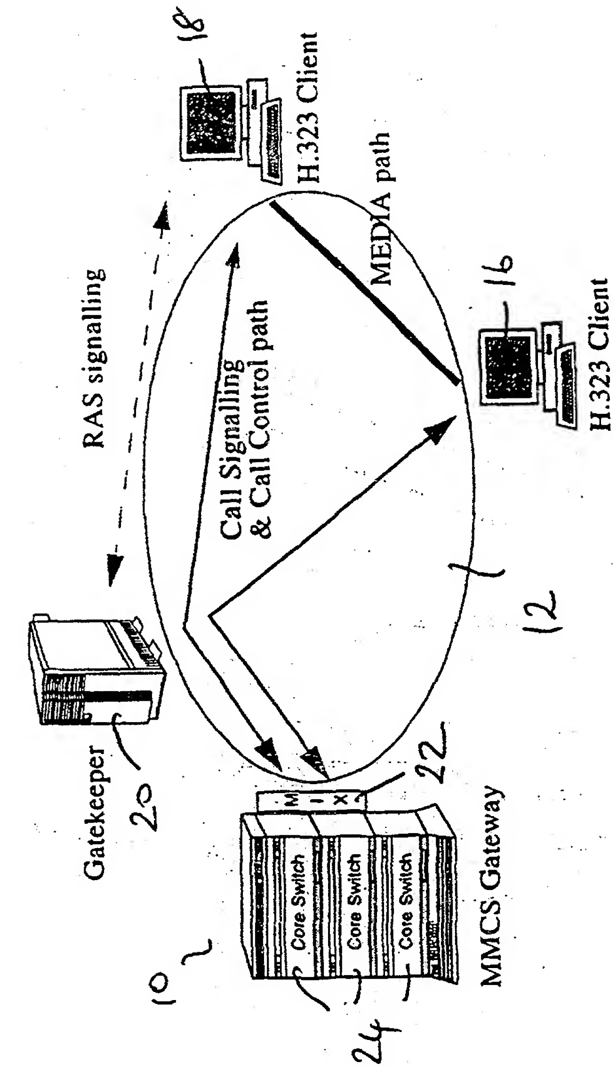

18
H.323 Client
RAS signalling
MEDIA path
16
H.323 Client
Call Signalling
& Call Control path
Gatekeeper
20
22
12
M
I
X
Core Switch
Core Switch
Core Switch
10
24
MMCS Gateway

Fig. 23

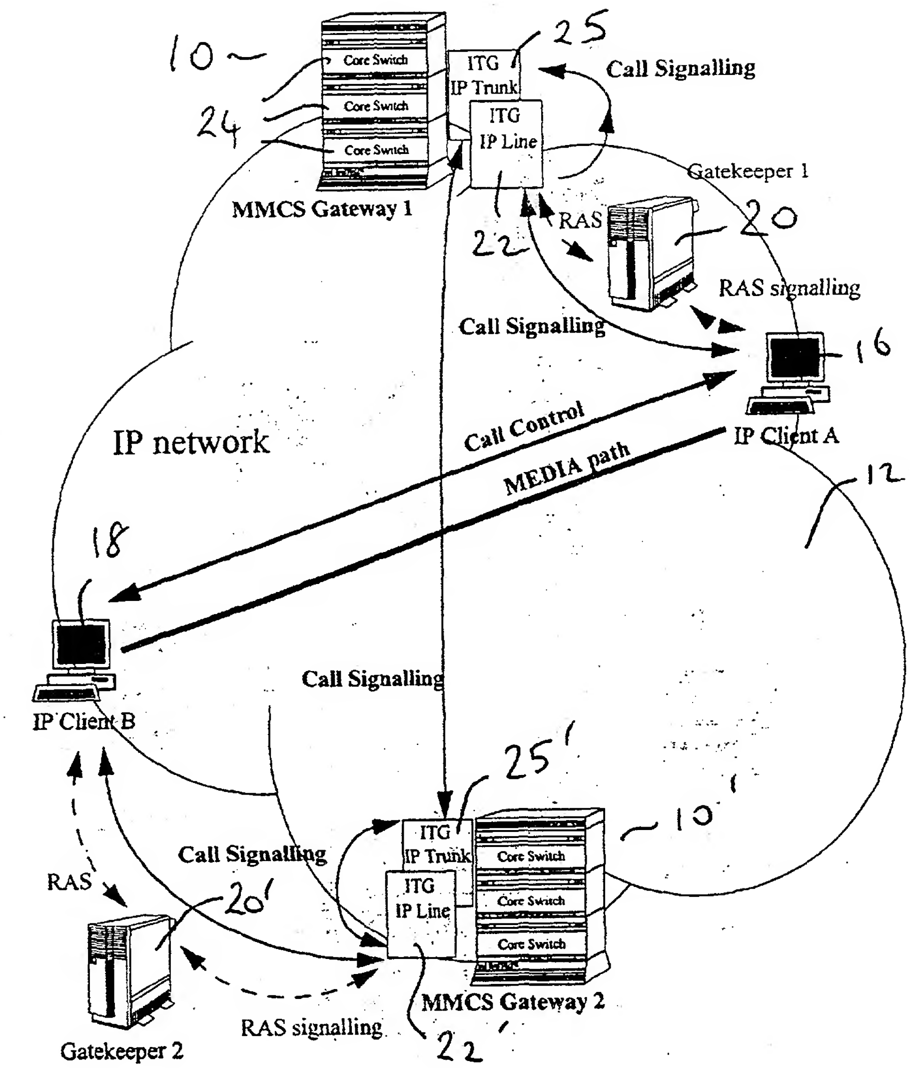

10
25
24
Core Switch
Core Switch
Core Switch
ITG
IP Trunk
ITG
IP Line
Call Signalling
Gatekeeper 1
MMCS Gateway 1
22
RAS
20
RAS signalling
Call Signalling
16
IP Client A
IP network
Call Control
MEDIA path
12
18
IP Client B
Call Signalling
25'
10'
ITG
IP Trunk
ITG
IP Line
Core Switch
Core Switch
Core Switch
Call Signalling
RAS
20'
MMCS Gateway 2
RAS signalling
22'
Gatekeeper 2

Fig. 25

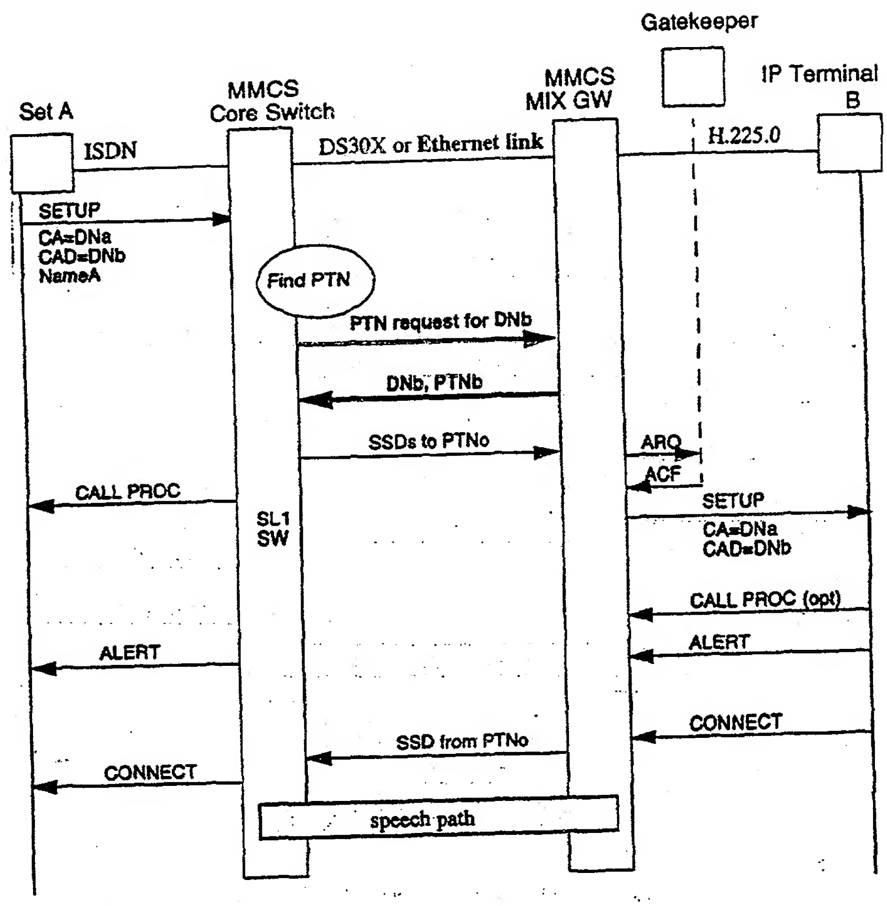

Gatekeeper
Set A
MMCS
Core Switch
MMCS
MIX GW
IP Terminal
B
ISDN
DS30X or Ethernet link
H.225.0
SETUP
CA=DNa
CAD=DNb
NameA
Find PTN
PTN request for DNb
DNb, PTNb
SSDs to PTNo
ARQ
ACF
CALL PROC
SL1
SW
SETUP
CA=DNa
CAD=DNb
CALL PROC (opt)
ALERT
ALERT
CONNECT
SSD from PTNo
CONNECT
speech path

Fig. 26

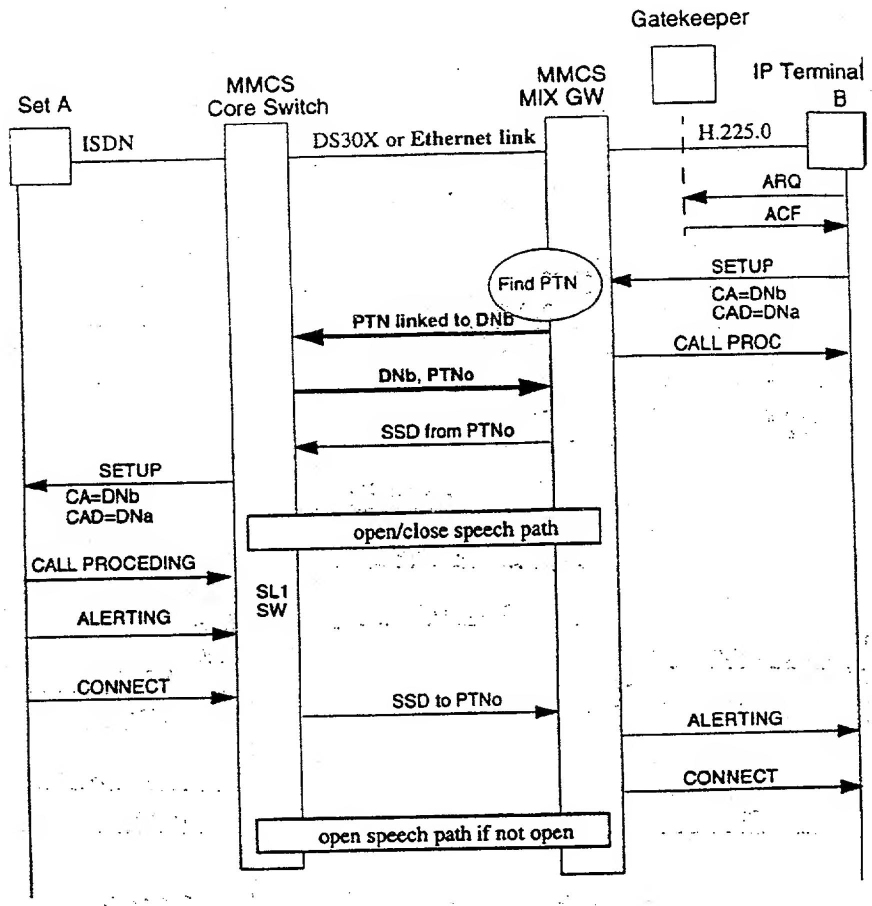

Gatekeeper
Set A
MMCS
Core Switch
MMCS
MIX GW
IP Terminal
B
ISDN
DS30X or Ethernet link
H.225.0
ARQ
ACF
SETUP
CA=DNb
CAD=DNa
Find PTN
PTN linked to DNb
CALL PROC
DNb, PTNo
SSD from PTNo
SETUP
CA=DNb
CAD=DNa
open/close speech path
CALL PROCEDING
SL1
SW
ALERTING
CONNECT
SSD to PTNo
ALERTING
CONNECT
open speech path if not open

Fig.27

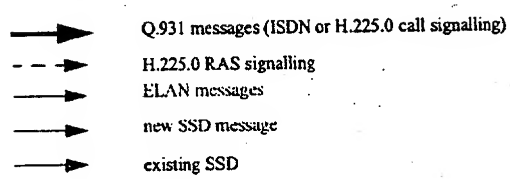

Q.931 messages (ISDN or H.225.0 call signalling)
H.225.0 RAS signalling
ELAN messages
new SSD message
existing SSD

Fig. 28

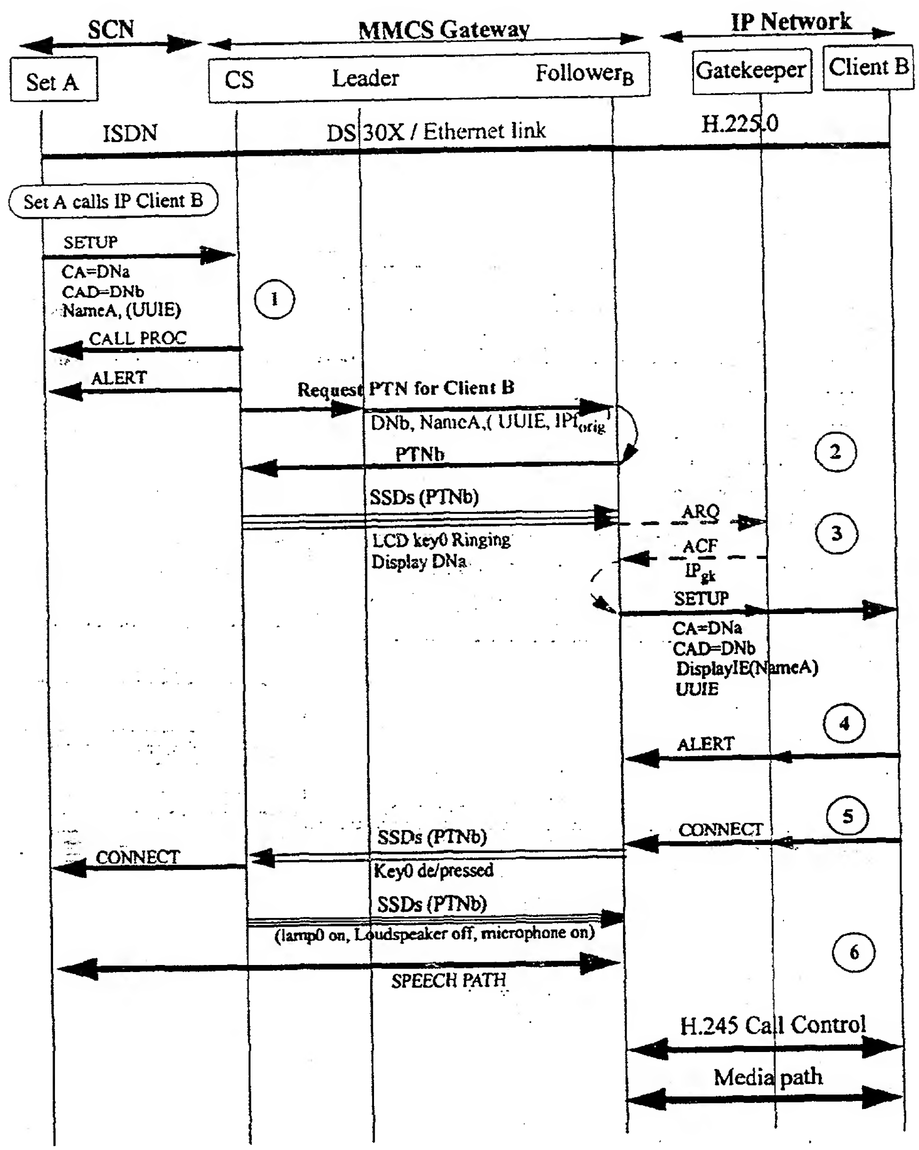

SCN
MMCS Gateway
IP Network
Set A
CS
Leader
Follower$_B$
Gatekeeper
Client B
ISDN
DS30X / Ethernet link
H.225.0
Set A calls IP Client B
SETUP
CA=DNa
CAD=DNb
NameA, (UUIE)
1
CALL PROC
ALERT
Request PTN for Client B
DNb, NameA,(UUIE, IP$_{orig}$)
PTNb
2
SSDs (PTNb)
ARQ
3
LCD key0 Ringing
Display DNa
ACF
IP$_{gk}$
SETUP
CA=DNa
CAD=DNb
DisplayIE(NameA)
UUIE
4
ALERT
5
CONNECT
SSDs (PTNb)
CONNECT
Key0 de/pressed
SSDs (PTNb)
(lamp0 on, Loudspeaker off, microphone on)
6
SPEECH PATH
H.245 Call Control
Media path

Fig. 29

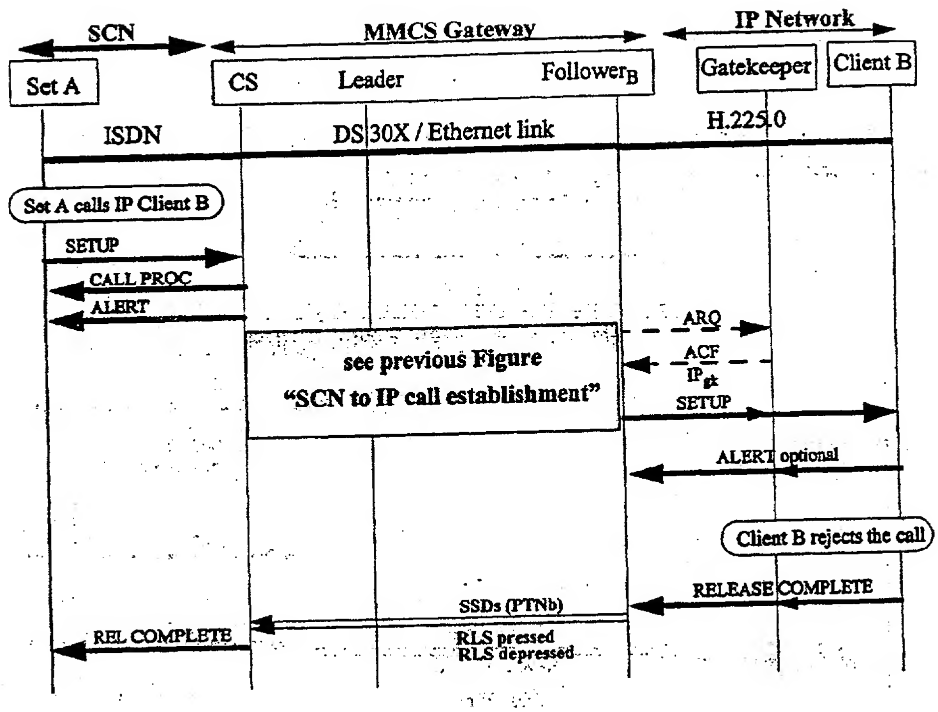

SCN
MMCS Gateway
IP Network
Set A
CS
Leader
Follower$_B$
Gatekeeper
Client B
ISDN
DS 30X / Ethernet link
H.225.0
Set A calls IP Client B
SETUP
CALL PROC
ALERT
ARQ
ACF
IP$_{gk}$
see previous Figure
"SCN to IP call establishment"
SETUP
ALERT optional
Client B rejects the call
RELEASE COMPLETE
SSDs (PTNb)
REL COMPLETE
RLS pressed
RLS depressed

Fig. 30

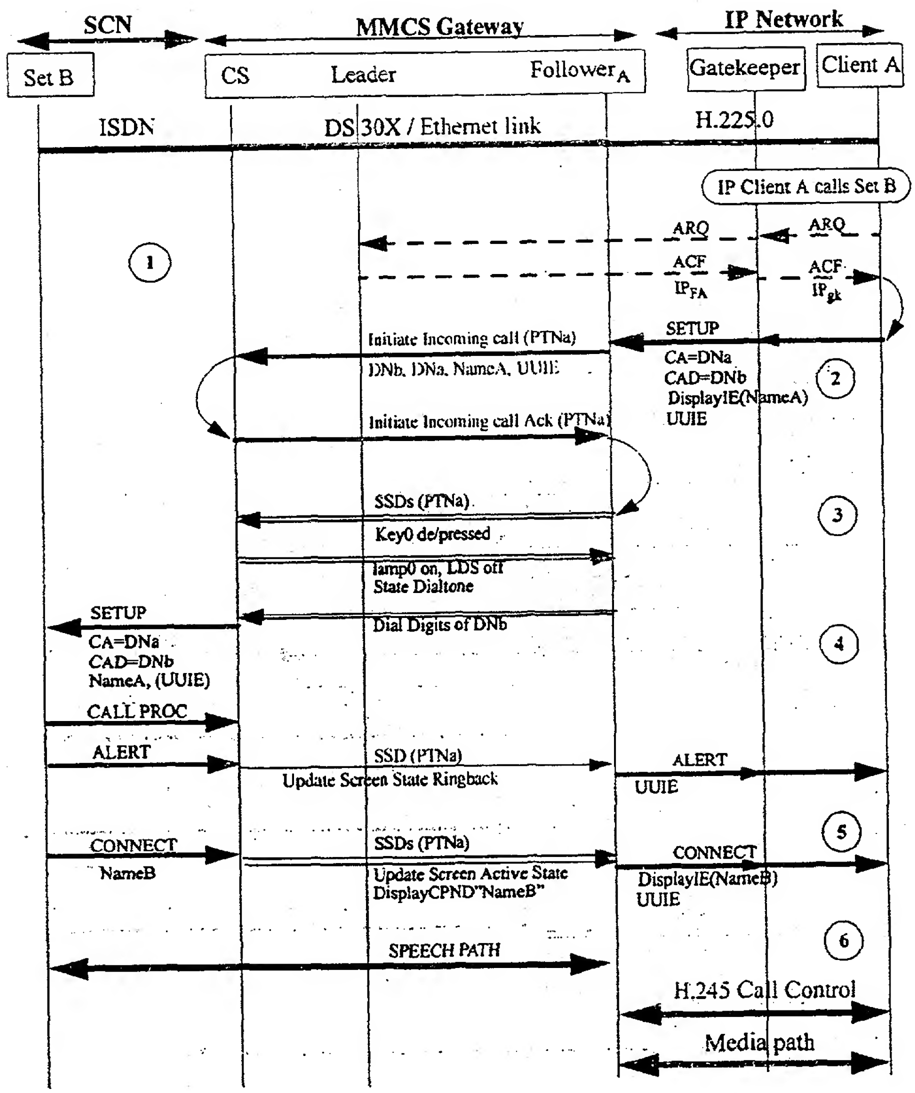
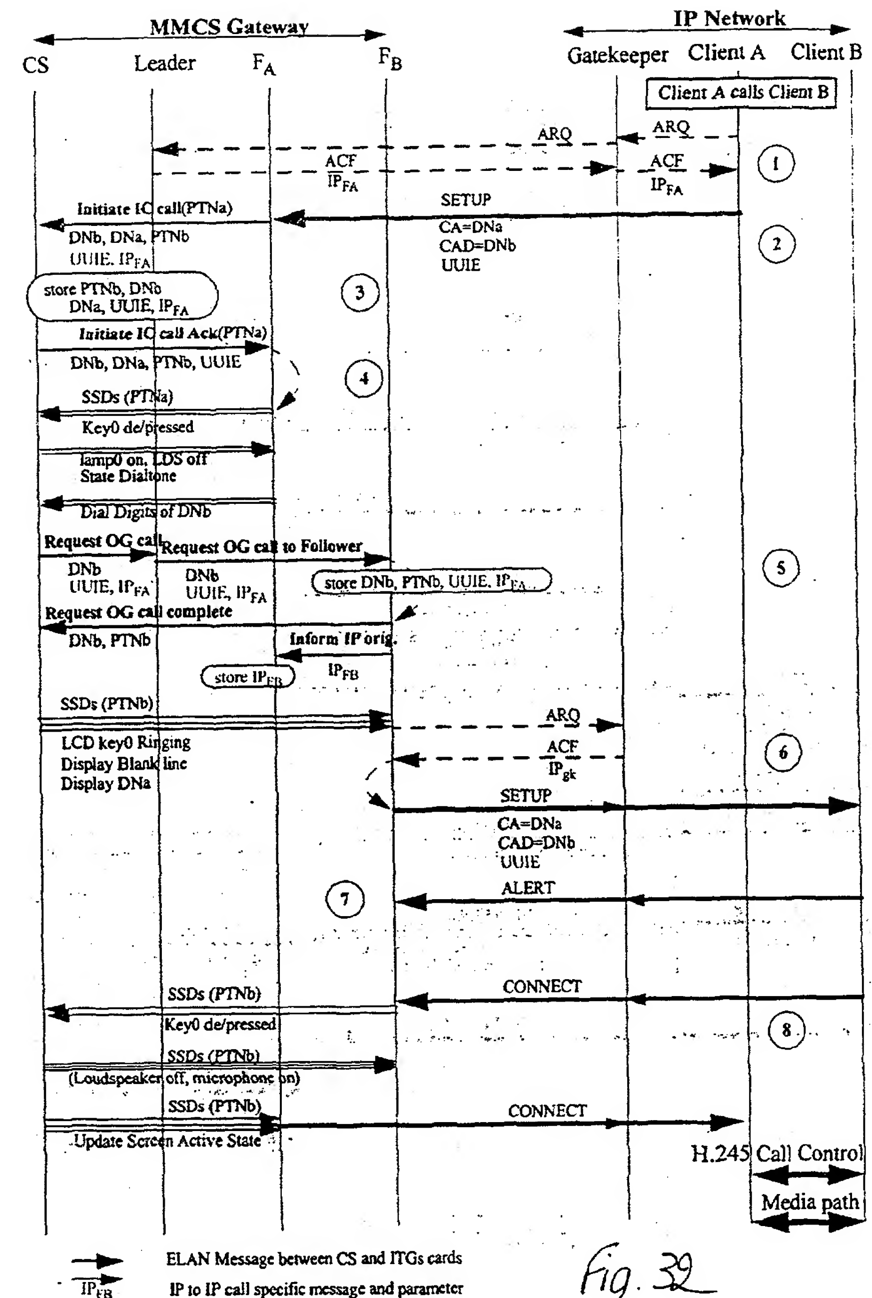
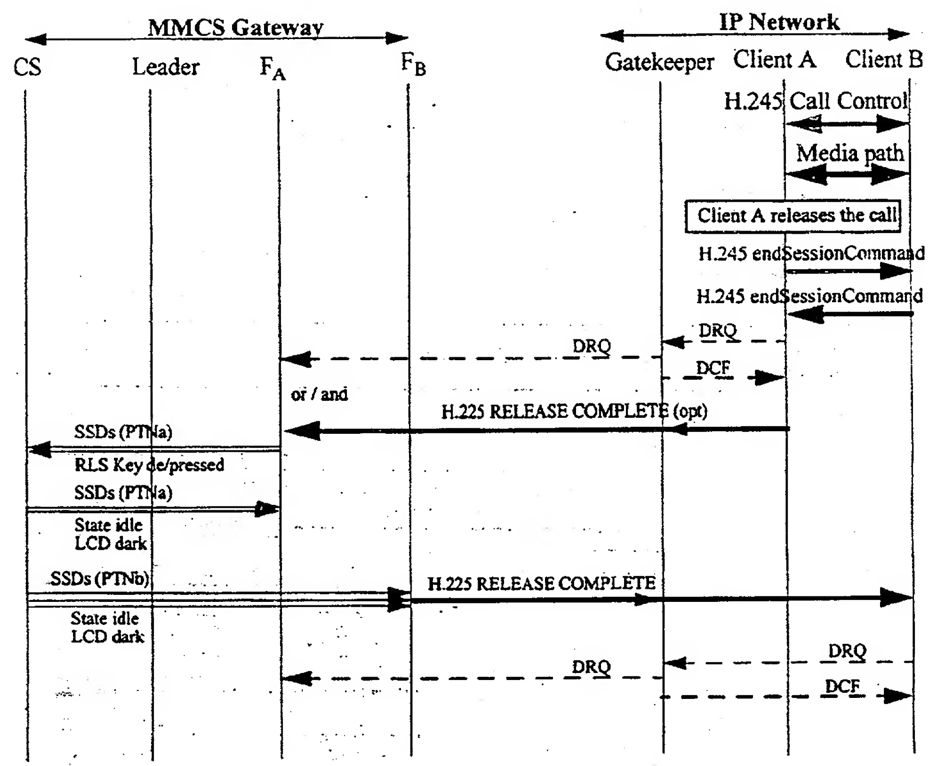

SCN
MMCS Gateway
IP Network
Set B
CS
Leader
Follower$_A$
Gatekeeper
Client A
ISDN
DS 30X / Ethernet link
H.225.0
IP Client A calls Set B
ARQ
ARQ
ACF
IP_{FA}
ACF
IP_{gk}
1
SETUP
Initiate Incoming call (PTNa)
DNb, DNa, NameA, UUIE
CA=DNa
CAD=DNb
DisplayIE(NameA)
UUIE
2
Initiate Incoming call Ack (PTNa)
SSDs (PTNa)
3
Key0 de/pressed
lamp0 on, LDS off
State Dialtone
SETUP
CA=DNa
CAD=DNb
NameA, (UUIE)
Dial Digits of DNb
4
CALL PROC
ALERT
SSD (PTNa)
Update Screen State Ringback
ALERT
UUIE
5
CONNECT
NameB
SSDs (PTNa)
Update Screen Active State
DisplayCPND"NameB"
CONNECT
DisplayIE(NameB)
UUIE
6
SPEECH PATH
H.245 Call Control
Media path

Fig. 31



MMCS Gateway
IP Network
CS
Leader
F_A
F_B
Gatekeeper
Client A
Client B
Client A calls Client B
ARQ
ARQ
ACF IP_{FA}
ACF IP_{FA}
1
Initiate IC call(PTNa)
DNb, DNa, PTNb
UUIE, IP_{FA}
SETUP
CA=DNa
CAD=DNb
UUIE
2
store PTNb, DNb
DNa, UUIE, IP_{FA}
3
Initiate IC call Ack(PTNa)
DNb, DNa, PTNb, UUIE
4
SSDs (PTNa)
Key0 de/pressed
lamp0 on, LDS off
State Dialtone
Dial Digits of DNb
Request OG call
DNb
UUIE, IP_{FA}
Request OG call to Follower
DNb
UUIE, IP_{FA}
store DNb, PTNb, UUIE, IP_{FA}
5
Request OG call complete
DNb, PTNb
Inform IP orig.
IP_{FB}
store IP_{FB}
SSDs (PTNb)
ARQ
LCD key0 Ringing
Display Blank line
Display DNa
ACF IP_{gk}
6
SETUP
CA=DNa
CAD=DNb
UUIE
ALERT
7
CONNECT
SSDs (PTNb)
Key0 de/pressed
8
SSDs (PTNb)
(Loudspeaker off, microphone on)
SSDs (PTNb)
CONNECT
Update Screen Active State
H.245 Call Control
Media path
ELAN Message between CS and ITGs cards
IP_{FB} IP to IP call specific message and parameter

Fig. 32



MMCS Gateway
IP Network
CS
Leader
F_A
F_B
Gatekeeper
Client A
Client B
H.245 Call Control
Media path
Client A releases the call
H.245 endSessionCommand
H.245 endSessionCommand
DRQ
DRQ
DCF
or / and
H.225 RELEASE COMPLETE (opt)
SSDs (PTNa)
RLS Key de/pressed
SSDs (PTNa)
State idle
LCD dark
SSDs (PTNb)
H.225 RELEASE COMPLETE
State idle
LCD dark
DRQ
DRQ
DCF

Fig. 33

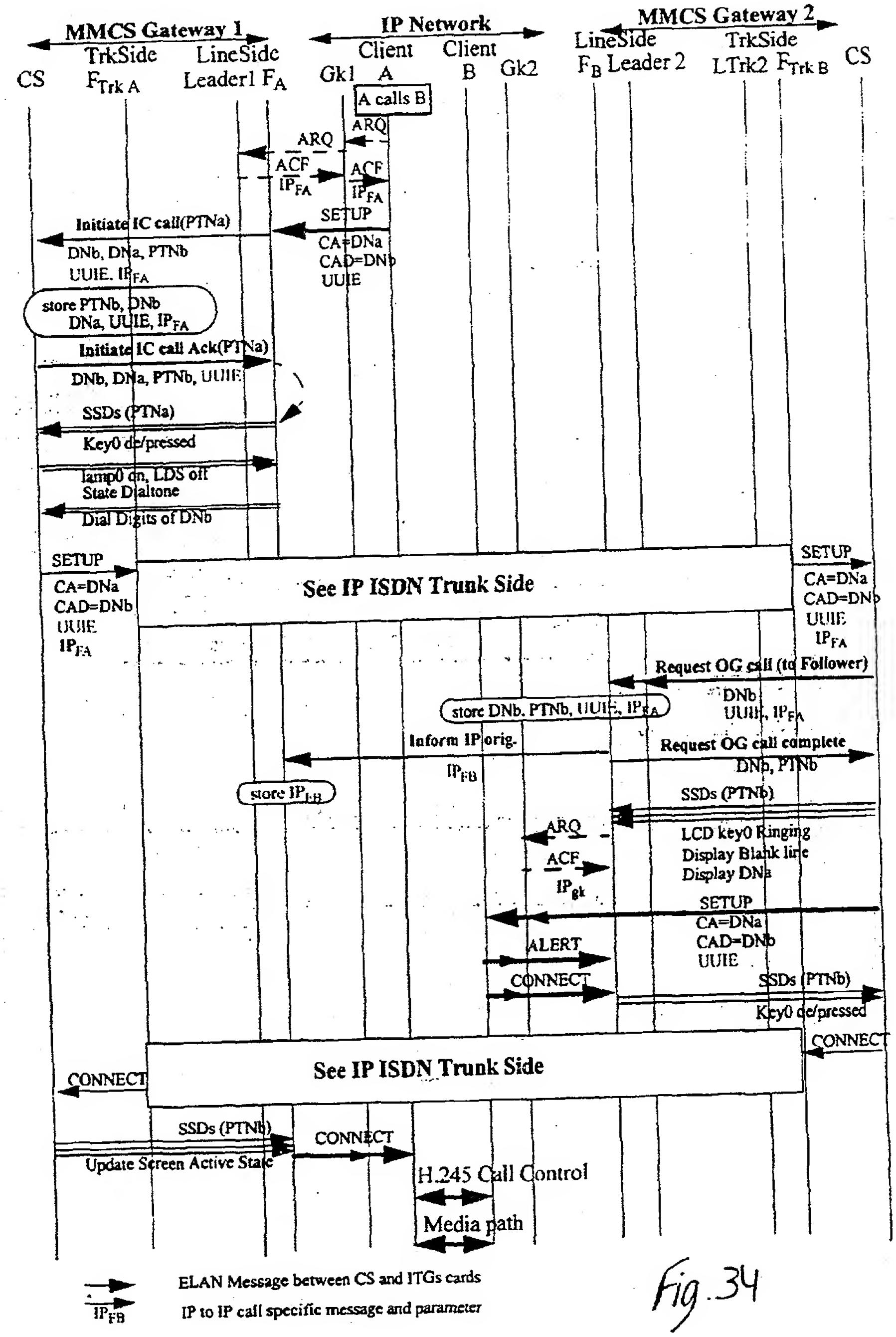

MMCS Gateway 1
TrkSide
LineSide
CS
FTrk A
Leader1 FA
IP Network
Client A
Client B
Gk1
Gk2
MMCS Gateway 2
LineSide
TrkSide
FB Leader 2
LTrk2 FTrk B
CS
A calls B
ARQ
ACF
IPFA
SETUP
CA=DNa
CAD=DNb
UUIE
Initiate IC call(PTNa)
DNb, DNa, PTNb
UUIE, IPFA
store PTNb, DNb
DNa, UUIE, IPFA
Initiate IC call Ack(PTNa)
DNb, DNa, PTNb, UUIE
SSDs (PTNa)
Key0 de/pressed
lamp0 on, LDS off
State Dialtone
Dial Digits of DNb
See IP ISDN Trunk Side
Request OG call (to Follower)
DNb
UUIE, IPFA
store DNb, PTNb, UUIE, IPFA
Inform IP orig.
IPFB
Request OG call complete
DNb, PTNb
store IPFB
SSDs (PTNb)
LCD key0 Ringing
Display Blank line
Display DNa
IPgk
ALERT
CONNECT
Update Screen Active State
H.245 Call Control
Media path
ELAN Message between CS and ITGs cards
IP to IP call specific message and parameter

Fig. 34

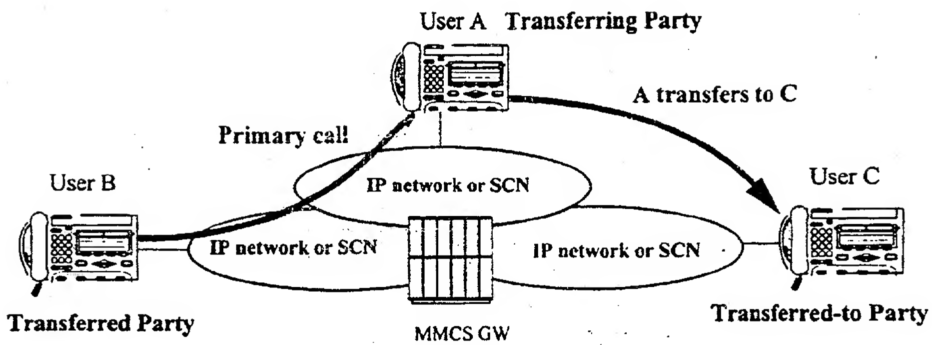


Fig. 35

	Q.931 messages (ISDN or H.225.0 call signalling)
	ELAN messages dedicated to Call Transfer operation
	SSD messages
	H.225.0 RAS signalling
xxx.inv	invoke PDU for operation xxx
xxx.rr	return result PDU for operation xxx
xxx.re	return error PDU for operation xxx
F_{X2}	Follower Card which handles the IP call to Client X. This call is the **secondary** call of the call transfer operation
L	Leader Card
rrNb	rerouting Number
XingNb	transferring Number

Fig. 36

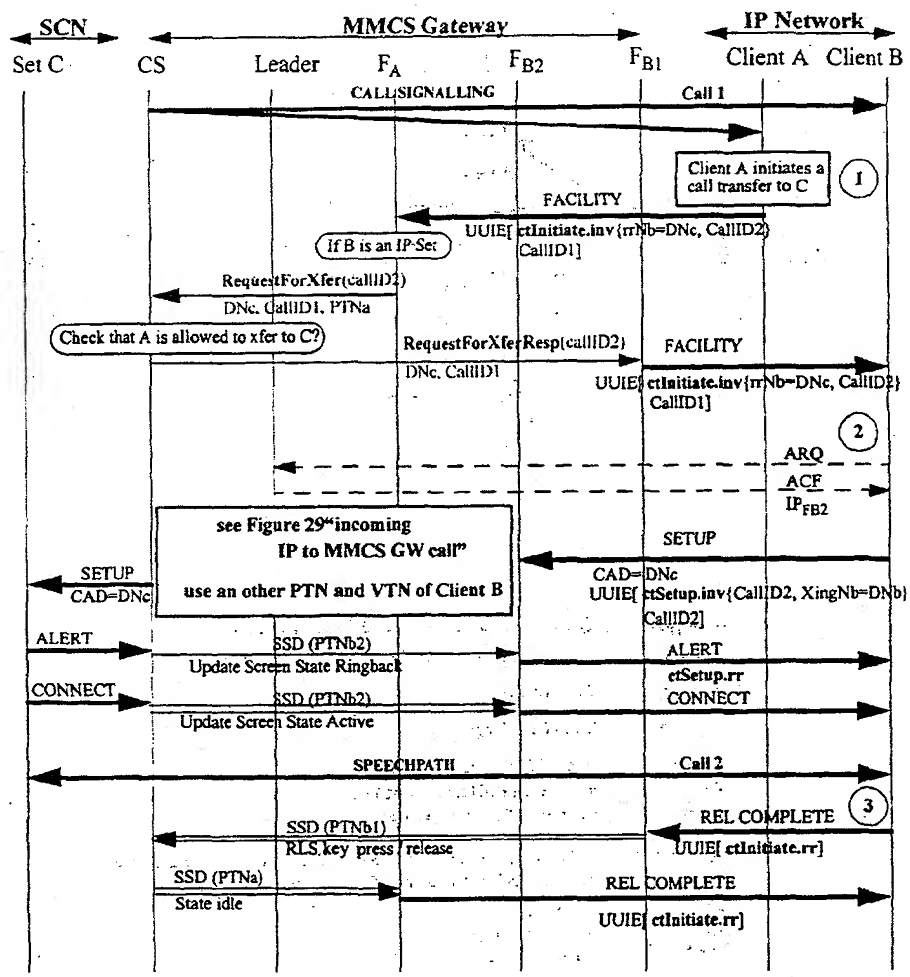

SCN
MMCS Gateway
IP Network
Set C
CS
Leader
F_A
F_{B2}
F_{B1}
Client A
Client B
CALL SIGNALLING
Call 1
Client A initiates a call transfer to C
1
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2} CallID1]
If B is an IP-Set
RequestForXfer(callID2)
DNc, CallID1, PTNa
Check that A is allowed to xfer to C?
RequestForXferResp(callID2)
DNc, CallID1
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2} CallID1]
2
ARQ
ACF
IP_{FB2}
see Figure 29"incoming IP to MMCS GW call"
use an other PTN and VTN of Client B
SETUP
CAD=DNc
SETUP
CAD=DNc
UUIE[ctSetup.inv{CallID2, XingNb=DNb} CallID2]
ALERT
SSD (PTNb2)
Update Screen State Ringback
ALERT
ctSetup.rr
CONNECT
SSD (PTNb2)
Update Screen State Active
CONNECT
SPEECHPATH
Call 2
3
REL COMPLETE
UUIE[ctInitiate.rr]
SSD (PTNb1)
RLS key press / release
SSD (PTNa)
State idle
REL COMPLETE
UUIE[ctInitiate.rr]

Fig. 37

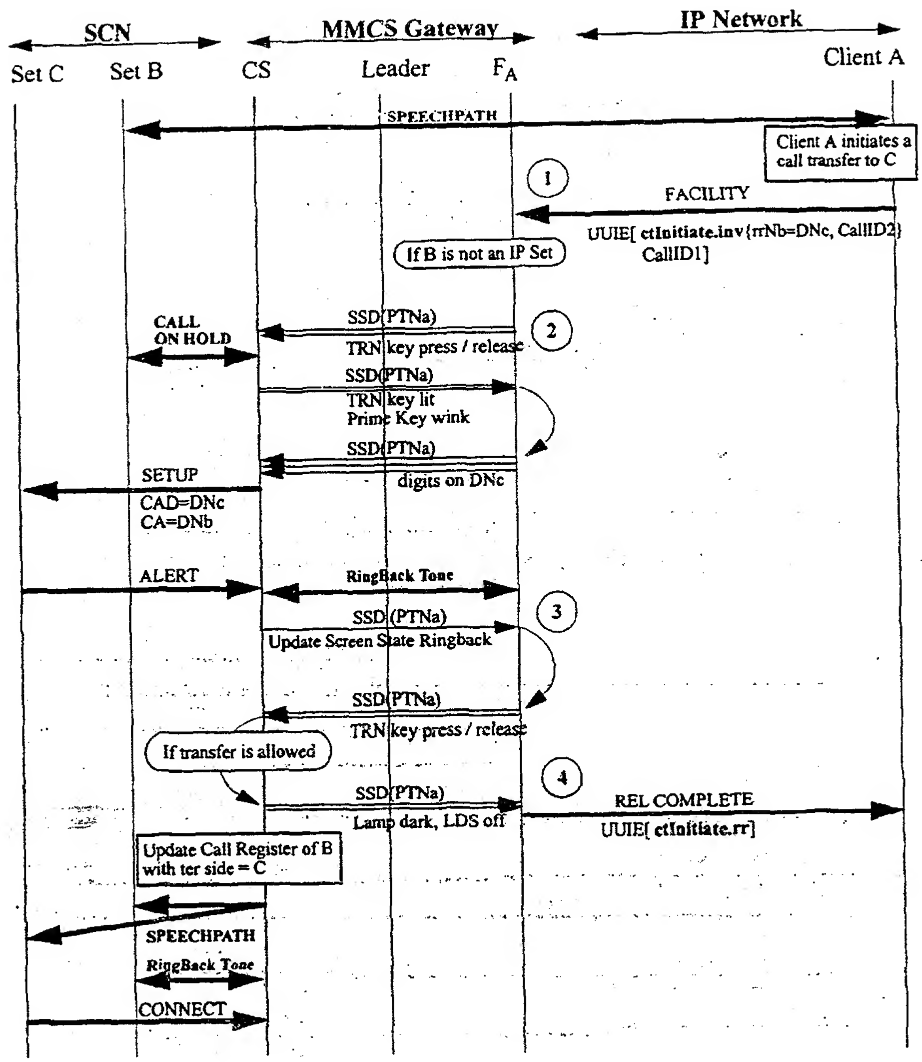

SCN
MMCS Gateway
IP Network
Set C
Set B
CS
Leader
F_A
Client A
SPEECHPATH
Client A initiates a call transfer to C
1
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2} CallID1]
If B is not an IP Set
SSD(PTNa)
2
CALL ON HOLD
TRN key press / release
SSD(PTNa)
TRN key lit
Prime Key wink
SSD(PTNa)
SETUP
CAD=DNc
CA=DNb
digits on DNc
ALERT
RingBack Tone
SSD (PTNa)
3
Update Screen State Ringback
SSD(PTNa)
TRN key press / release
If transfer is allowed
4
SSD(PTNa)
Lamp dark, LDS off
REL COMPLETE
UUIE[ctInitiate.rr]
Update Call Register of B with ter side = C
SPEECHPATH
RingBack Tone
CONNECT

Fig. 38

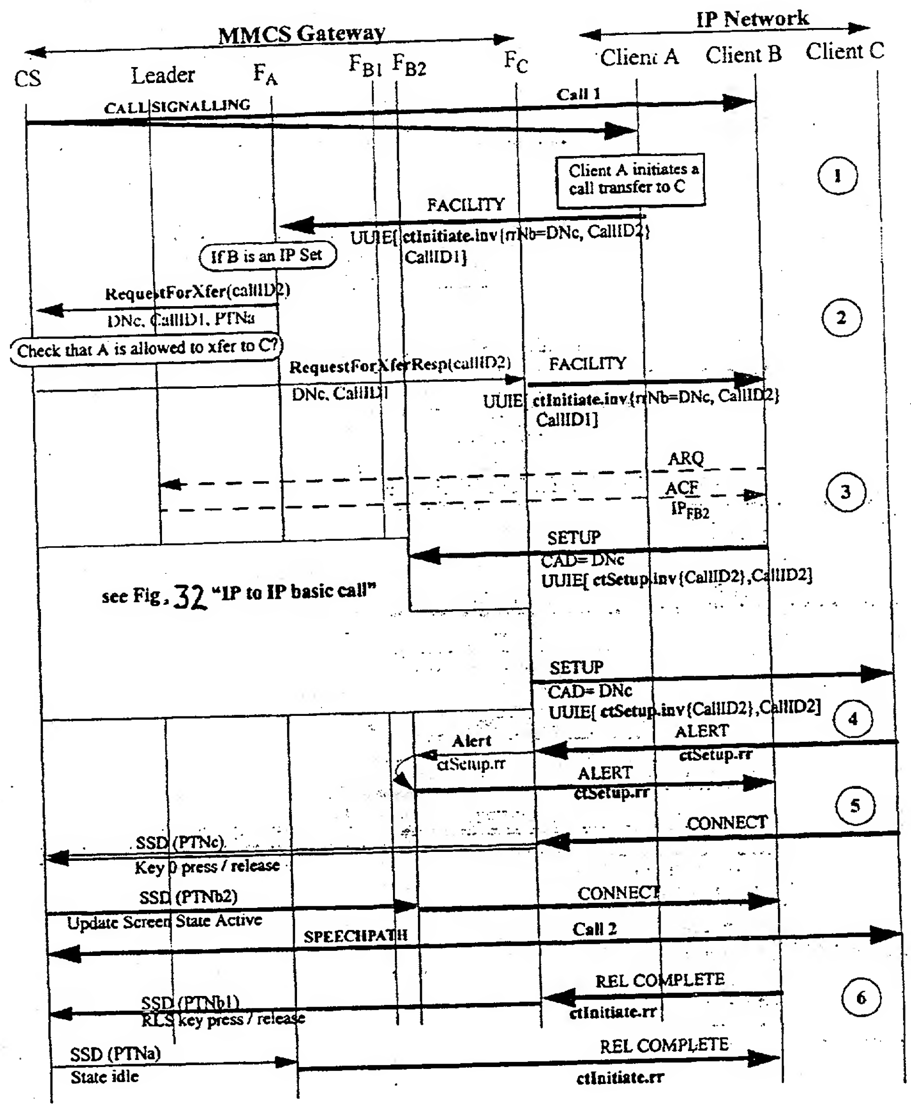
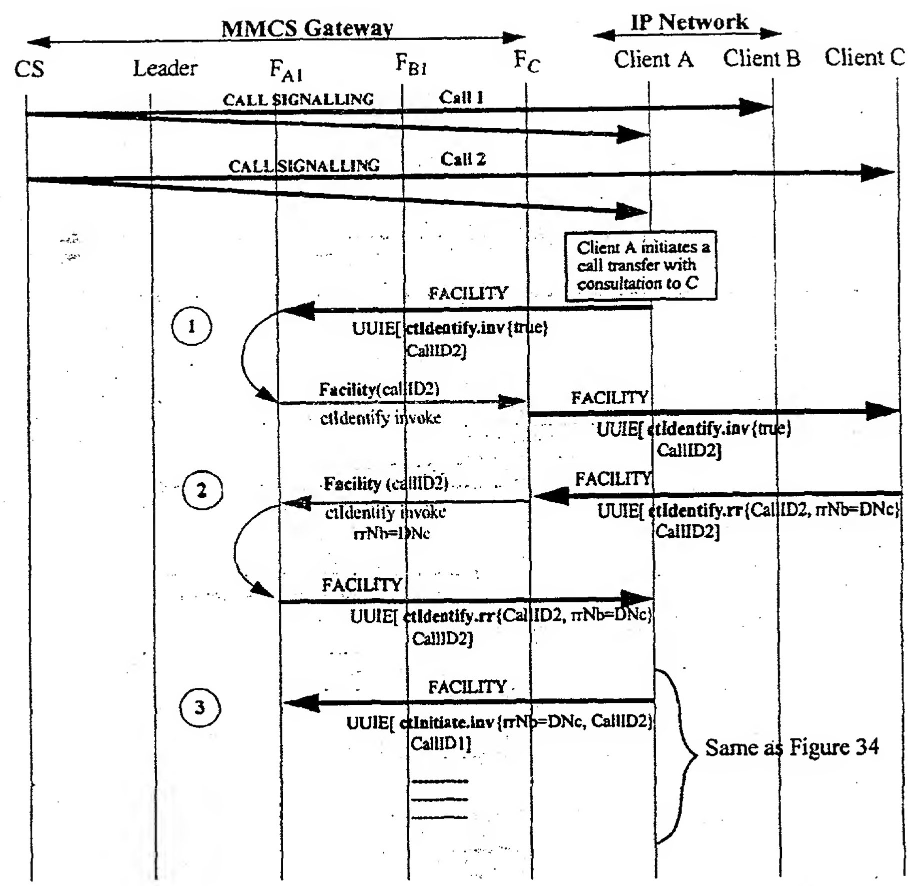

MMCS Gateway
IP Network
CS
Leader
F_A
F_{B1}
F_{B2}
F_C
Client A
Client B
Client C
CALL SIGNALLING
Call 1
Client A initiates a call transfer to C
1
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2}
CallID1}
If B is an IP Set
RequestForXfer(callID2)
DNc, CallID1, PTNa
2
Check that A is allowed to xfer to C?
RequestForXferResp(callID2)
DNc, CallID1
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2}
CallID1]
ARQ
ACF
IP_{FB2}
3
SETUP
CAD= DNc
UUIE[ctSetup.inv{CallID2},CallID2]
see Fig. 32 "IP to IP basic call"
SETUP
CAD= DNc
UUIE[ctSetup.inv{CallID2},CallID2]
4
ALERT
ctSetup.rr
Alert
ctSetup.rr
ALERT
ctSetup.rr
5
CONNECT
SSD (PTNc)
Key 0 press / release
SSD (PTNb2)
Update Screen State Active
CONNECT
SPEECHPATH
Call 2
REL COMPLETE
ctInitiate.rr
6
SSD (PTNb1)
RLS key press / release
SSD (PTNa)
State idle
REL COMPLETE
ctInitiate.rr

Fig. 39



MMCS Gateway
IP Network
CS
Leader
F_{A1}
F_{B1}
F_C
Client A
Client B
Client C
CALL SIGNALLING
Call 1
CALL SIGNALLING
Call 2
Client A initiates a call transfer with consultation to C
FACILITY
1
UUIE[ctIdentify.inv{true} CallID2]
Facility(callID2)
ctIdentify invoke
FACILITY
UUIE[ctIdentify.inv{true} CallID2]
2
Facility (callID2)
ctIdentify invoke rrNb=DNc
FACILITY
UUIE[ctIdentify.rr{CallID2, rrNb=DNc} CallID2]
FACILITY
UUIE[ctIdentify.rr{CallID2, rrNb=DNc} CallID2]
3
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2} CallID1]
Same as Figure 34

Fig. 40

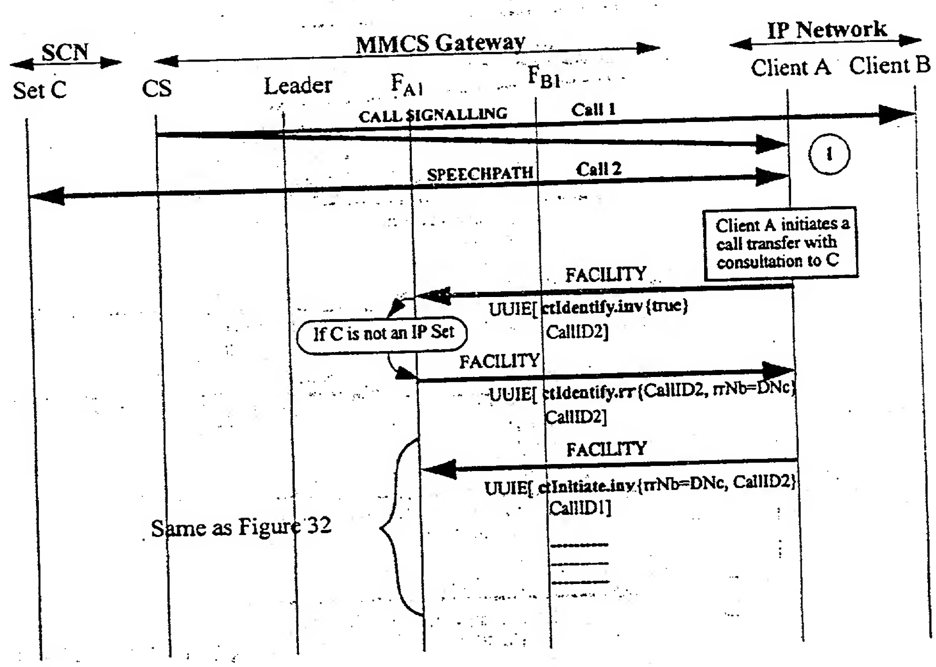

SCN
MMCS Gateway
IP Network
Set C
CS
Leader
F_{A1}
F_{B1}
Client A
Client B
CALL SIGNALLING
Call 1
1
SPEECHPATH
Call 2
Client A initiates a call transfer with consultation to C
FACILITY
UUIE[ctIdentify.inv{true} CallID2]
If C is not an IP Set
FACILITY
UUIE[ctIdentify.rr{CallID2, rrNb=DNc} CallID2]
FACILITY
UUIE[ctInitiate.inv{rrNb=DNc, CallID2} CallID1]
Same as Figure 32

Fig. 41

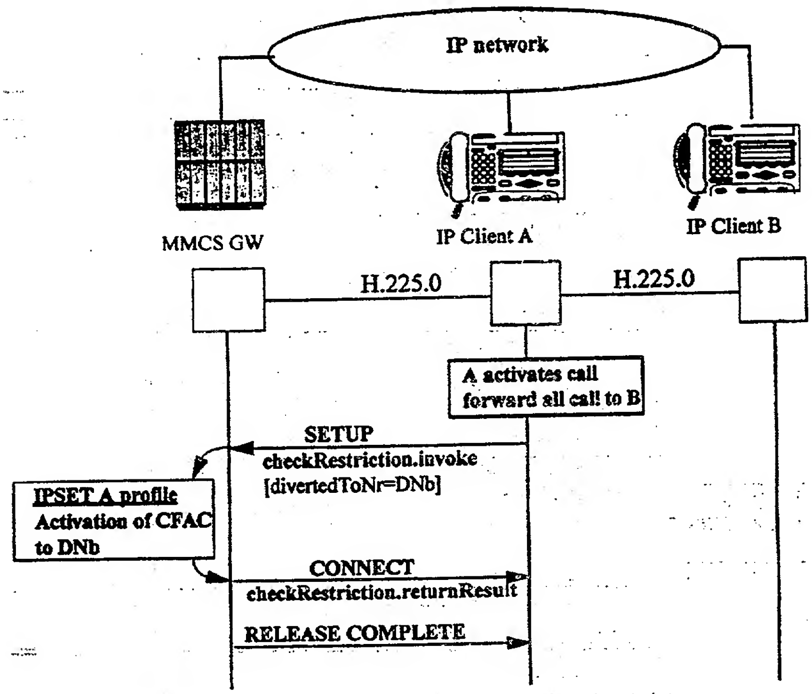

IP network
MMCS GW
IP Client A
IP Client B
H.225.0
H.225.0
A activates call forward all call to B
SETUP
checkRestriction.invoke
[divertedToNr=DNb]
IPSET A profile
Activation of CFAC to DNb
CONNECT
checkRestriction.returnResult
RELEASE COMPLETE

Fig. 42

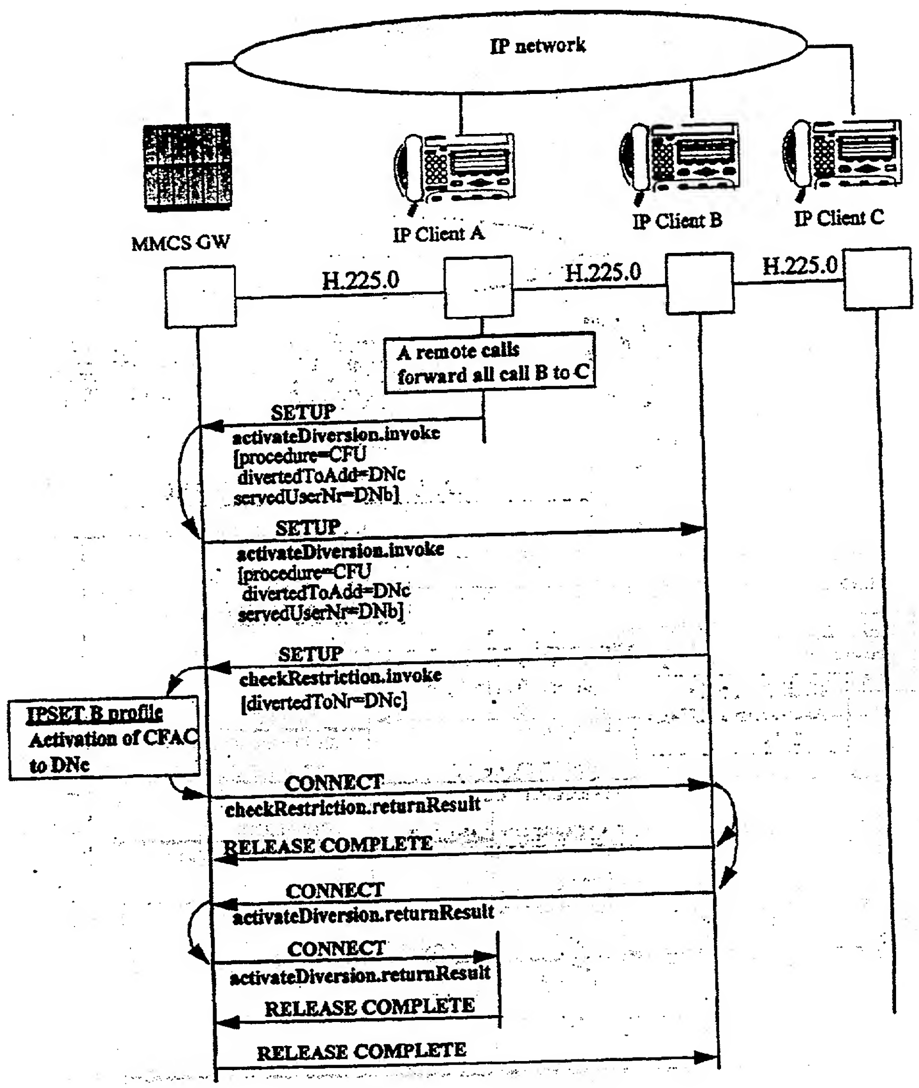

IP network
MMCS GW
IP Client A
IP Client B
IP Client C
H.225.0
H.225.0
H.225.0
A remote calls forward all call B to C
SETUP
activateDiversion.invoke
[procedure=CFU
divertedToAdd=DNc
servedUserNr=DNb]
SETUP
activateDiversion.invoke
[procedure=CFU
divertedToAdd=DNc
servedUserNr=DNb]
SETUP
checkRestriction.invoke
[divertedToNr=DNc]
IPSET B profile
Activation of CFAC to DNc
CONNECT
checkRestriction.returnResult
RELEASE COMPLETE
CONNECT
activateDiversion.returnResult
CONNECT
activateDiversion.returnResult
RELEASE COMPLETE
RELEASE COMPLETE

Fig. 43

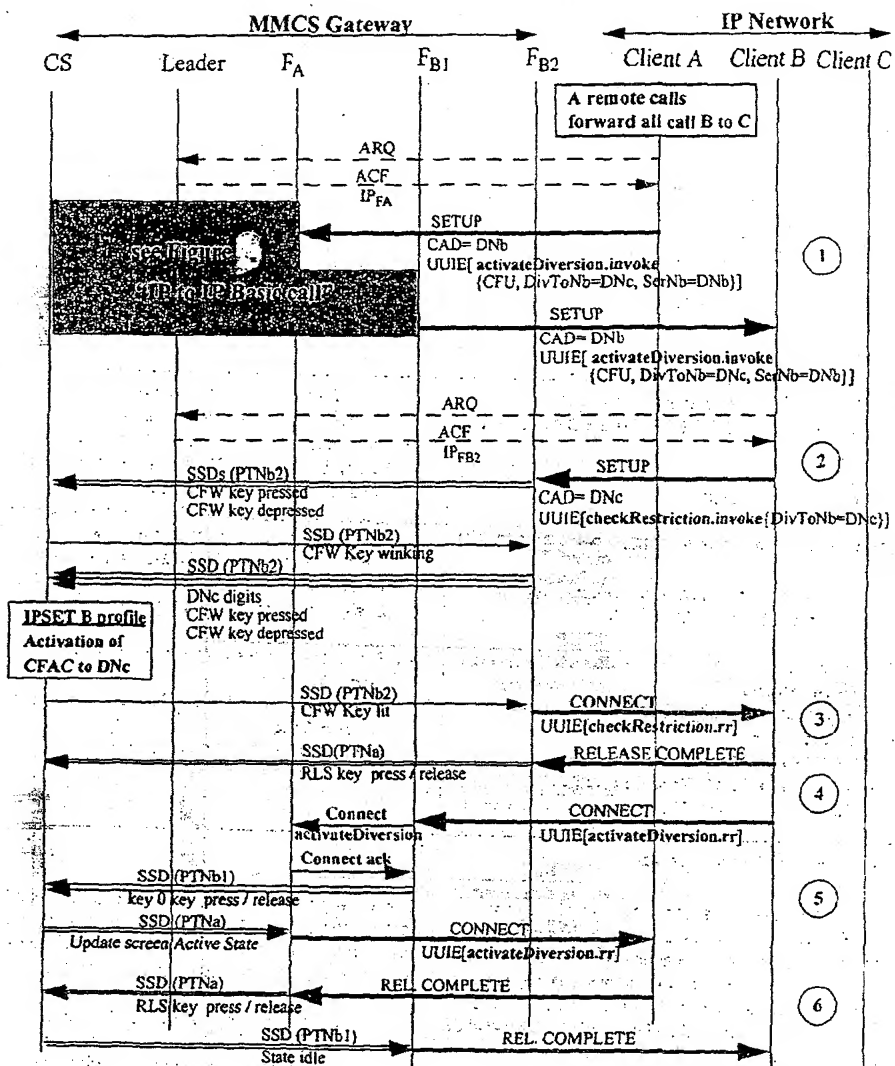

MMCS Gateway
IP Network
CS
Leader
F_A
F_B1
F_B2
Client A
Client B
Client C
A remote calls forward all call B to C
ARQ
ACF
IP_FA
SETUP
CAD= DNb
UUIE[activateDiversion.invoke {CFU, DivToNb=DNc, SerNb=DNb}]
1
SETUP
CAD= DNb
UUIE[activateDiversion.invoke {CFU, DivToNb=DNc, SerNb=DNb}]
ARQ
ACF
IP_FB2
SETUP
2
SSDs (PTNb2)
CFW key pressed
CFW key depressed
CAD= DNc
UUIE[checkRestriction.invoke{DivToNb=DNc}]
SSD (PTNb2)
CFW Key winking
SSD (PTNb2)
DNc digits
CFW key pressed
CFW key depressed
IPSET B profile
Activation of CFAC to DNc
SSD (PTNb2)
CFW Key lit
CONNECT
UUIE[checkRestriction.rr]
3
SSD(PTNa)
RLS key press / release
RELEASE COMPLETE
4
Connect
activateDiversion
Connect ack
CONNECT
UUIE[activateDiversion.rr]
SSD (PTNb1)
key 0 key press / release
5
SSD (PTNa)
Update screen Active State
CONNECT
UUIE[activateDiversion.rr]
SSD (PTNa)
RLS key press / release
REL COMPLETE
6
SSD (PTNb1)
State idle
REL. COMPLETE

Fig. 44

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 966 145 A8

(12) # CORRECTED EUROPEAN PATENT APPLICATION

Note: Bibliography reflects the latest situation

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(22) Date of filing: 21.06.1999

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- Liotard, Michel c/o Nortel Europe S.A.
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(54) **IP telephony gateway**

(57) The present invention provides an IP telephony gateway. According to a first aspect of the invention, the gateway provides communications between a switched circuit network (SCN) and an IP network. The gateway can handle calls between clients on the switched circuit network and IP clients on the IP network. The gateway provides supplementary call services/features for calls to/from IP clients on the IP network, thus providing IP clients with similar features to those that are available to terminals on a PBX. The gateway is preferably a PBX which supports the supplementary services/features.

Advantageously, the gateway can also provide supplementary call services/features to calls between IP clients on the IP network. This can be achieved by routing call control signaling for IP client - IP client calls via the gateway where the services can be controlled.

A further aspect of the invention provides an IP network in which IP clients have access to a range of supplementary call features/services. At least one of the supplementary features/services is provided by a gateway, such as a PBX, at an interface to the IP network. A call from an IP client is routed via the gateway to apply the supplementary feature/service.

EP 0 966 145 A8

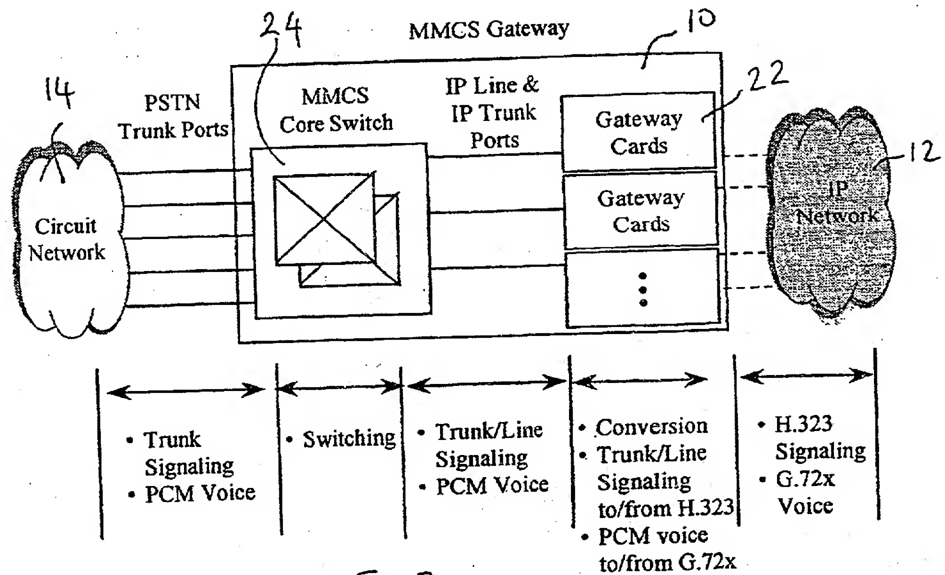
MMCS Gateway
10
24
14
PSTN
Trunk Ports
MMCS
Core Switch
IP Line &
IP Trunk
Ports
22
Gateway
Cards
Gateway
Cards
12
IP
Network
Circuit
Network
• Trunk
Signaling
• PCM Voice
• Switching
• Trunk/Line
Signaling
• PCM Voice
• Conversion
• Trunk/Line
Signaling
to/from H.323
• PCM voice
to/from G.72x
• H.323
Signaling
• G.72x
Voice

Fig. 3